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BRITISH
BUTTERFLIES AND MOTHS.

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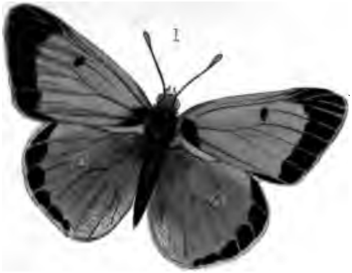

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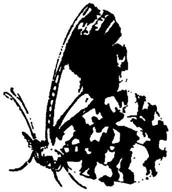

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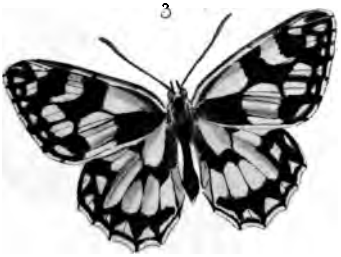

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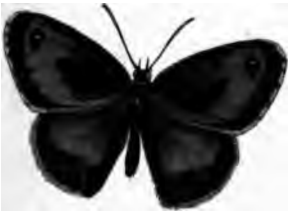

E W Robinson Del et Sc 1867

BRITISH

BUTTERFLIES AND MOTHS:

AN

INTRODUCTION TO THE STUDY OF OUR NATIVE LEPIDOPTERA.

BY

H. T. STAINTON, F.R.S., F.L.S.,

AUTHOR OF 'A MANUAL OF BRITISH BUTTERFLIES AND MOTHS;' 'THE NATURAL HISTORY OF THE TINEINA,' ETC. ETC.

EDITOR OF 'THE ENTOMOLOGIST'S ANNUAL,' 'THE ENTOMOLOGIST'S WEEKLY INTELLIGENCER,' 'THE ENTOMOLOGIST'S MONTHLY MAGAZINE.'

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TO

THE REVEREND JOHN HELLINS, M.A.,

AND TO

WILLIAM BUCKLER,

This Volume is respectfully Dedicated

AS A TRIFLING RETURN FOR THE VALUABLE AID ITS AUTHOR HAS
RECEIVED FROM THEIR NUMEROUS DESCRIPTIONS OF
LEPIDOPTEROUS LARVÆ,
WHICH BUT A FEW YEARS AGO WERE UNKNOWN TO US.

IN ADDITION,

THE AUTHOR TAKES THIS OPPORTUNITY OF AGAIN PUBLICLY THANKING THE
LAST-NAMED FOR THE VALUABLE ASSISTANCE HE RENDERED TO
THE NATURAL HISTORY OF THE TINEINA
DURING A CRITICAL PERIOD OF ITS EXISTENCE SOME YEARS AGO.

PREFACE.

THE object of the present volume has been to supply one of a series of volumes treating of the various vegetable and animal forms occurring in these islands.

The subject of British Butterflies might be thought to be pretty well exhausted, and yet for the young it is a subject ever fresh, and the schoolboy can pore with delight over a book treating of the Butterflies that flit around him, little heeding that what is so new to him is a trite subject to many of his seniors.

We have in this country no first-rate standard work treating of our Butterflies and Moths; we have Yarrell's 'British Fishes' and Yarrell's 'British Birds' and Hooker's 'British Ferns,' but we seek in vain for any analogous work treating of our Lepidopterous Fauna; we have nothing like Godart and Duponchel's 'Papillons de France,' or like Ochsenheimer and Trutschke's

'Schmetterlinge von Europa;' but though such a blank exists, it does not follow that it never *is* to be filled up.

Various circumstances have of late years tended to convince me that the time will come when something will really be done to supply a series of volumes treating of the British Lepidoptera; in the meantime many will be glad to find in these pages something more readable than the 'Manual,' whilst the attraction of coloured plates, carefully engraved by E. W. Robinson, may prove an inducement with those who look at plates first, letterpress afterwards.

H. T. STAINTON.

Mountsfield, Lewisham, S.E.,
July 4th, 1867.

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BRITISH BUTTERFLIES AND MOTHS.

CHAPTER I.

WHAT ARE BUTTERFLIES AND MOTHS?

This little volume treats, as its name implies, of 'Butterflies and Moths.' Now, what do we mean by 'Butterflies and Moths'?

Butterflies and Moths together form one of the great Orders of insects, technically termed *Lepidoptera* (from the two Greek words λεπίς, a scale, and πτερόν, a wing) — of which the most striking character is that the wings are clothed with scales. These scales are implanted by their roots into the colourless membrane of the wing, and

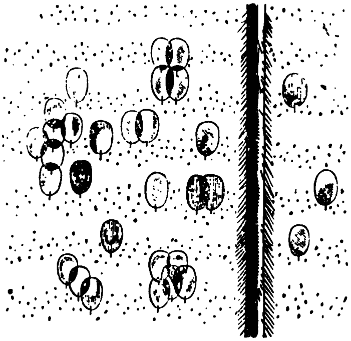

Fig. 1.—Portion of wing of moth (*Mania maura*) partially denuded of scales.

overlap each other partially like the scales of fishes or the feathers of birds; it is these small scales, which by by their varied and gay colouring furnish all that wonderful variety of tints we observe on the wings of many

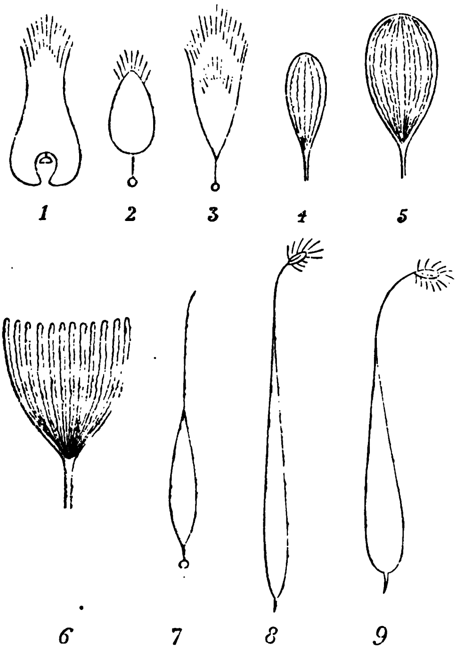

Fig. 2.—Plumule-scales of Butterflies. 1, *Pieris napi;* 2, *Aporia cratægi;* 3, *Anthocharis cardamines;* 4, *Polyommatus Corydon;* 5, *P. Ægon;* 6, *P. argiolus;* 7, *Erebia Blandina;* 8, *Argynnis Aglaia;* 9, *Lasiommata Megæra.*

butterflies and moths. If the scales be carefully removed, there remains simply the colourless and transparent membrane of the wing on which they were implanted.

Butterflies and moths feed on the honey they find in flowers, which they obtain by extending a long spiral proboscis or tongue, inserting it into the flowers, and then sucking up the sweet juices contained in them This tongue, when not unrolled, is coiled up into a compact little ball in front of the head, and is snugly placed between the palpi, which project on each side of it.

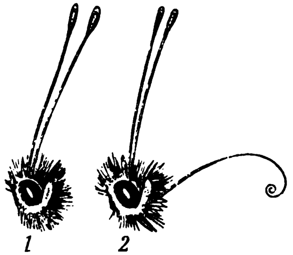

Fig. 3.—Head of *Pieris brassicæ.* 1, Proboscis coiled up; 2, Proboscis unrolled.

Butterflies and moths have four wings and six legs, and attached to the head, above the eyes, are two conspicuous antennæ. Now the antennæ of a butterfly differ from those of a moth, in having a stiffer, straighter look, and terminating in a little knob; the antennæ of a moth have very rarely that straight position we see in the antennæ of a butterfly, and instead of terminating in a knob, they taper gradually to a point.

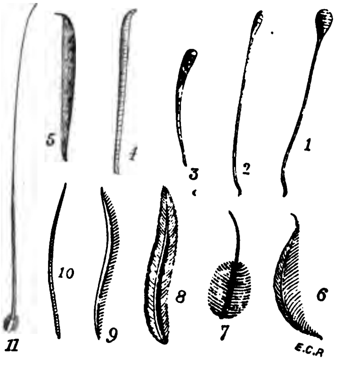

Fig. 4.—Antennæ of Butterflies and Moths (slightly magnified). 1, *Argynnis Aglaia;* 2, *Pieris brassicæ;* 3, *Gonepteryx rhamni;* 4, *Chærocampa Elpenor;* 5 *Sesia fuciformis;* 6, *Biston hirtarius;* 7, *Zenzera æsculi;* 8, *Odonestis potatoria;* 9, *Arctia caja;* 10, *Triphæna orbona;* 11, *Adela viridella.*

All butterflies fly by day; most moths fly by night,—yet some, generally such as are gaily coloured, fly by day, and some few fly indifferently at all hours. Thus *Plusia gamma,* which is most freely on the wing at evening dusk, may be found flying of its own accord in the early morning, in the forenoon, in the afternoon, and at night long after dark.

Most butterflies repose with the wings meeting perpendicularly over the back, in which position the upper sides of the wings are entirely concealed from sight. The majority of moths repose with the hind wings folded close to the body and the fore wings covering both them and the body, so that all that is exposed to view is the head and thorax and the upper surface of the anterior wings; however, there are many moths which in repose display all the four wings, and a few (amongst the *Geometrina*) rest like butterflies with their wings meeting over their backs.

CHAPTER II.

ON THE METAMORPHOSES OF BUTTERFLIES AND MOTHS.

EVERY butterfly and moth that we see was at one time contained within an *egg;* from that egg there came forth a worm-like creature termed a caterpillar; this caterpillar, which was at first very small, fed voraciously and grew rapidly—so rapidly that from time to time it cast its skin, the better to accommodate its rapid growth. When this caterpillar had attained its full growth, it again (after making certain preliminary preparations, varying according to the different species) cast its skin and assumed a totally different appearance.

Hitherto, however much it might have altered in its external appearance at successive moultings (and in some species these changes are very striking), it had always remained a caterpillar—endowed with legs, and therefore capable of walking, endowed with a mouth, and therefore capable of eating; but when the caterpillar skin is thrown off for the last time, the creature which remains has neither mouth nor legs, it eats not, walks not, but is a helpless mummy: this we term a chrysalis or pupa.

This chrysalis remains perfectly quiescent and inactive for two or three weeks at least,—sometimes for months,—and then the skin of the chrysalis cracking towards the anterior part, there crawls out from within, the imprisoned butterfly or moth.

At first, though in all other respects perfect and well-shapen, the wings are extremely small, the legs are full size, so are the antennæ, but the wings are no bigger than the small space which they had occupied whilst the insect was still inside the chrysalis skin; but the butterfly or moth crawls to some object, where it can place itself in such a position that the wings can hang down, when they very speedily grow, and in the space of an hour or less they are fully developed, and we see the butterfly or moth in its perfect or imago state.

Nearly all butterflies and moths when in the caterpillar state feed on the green leaves of living plants; hence it is necessary that the parent butterfly or moth should deposit her eggs either on the very leaves that the young larvæ will eat, or in their immediate vicinity—so that the young caterpillars may find food ready at hand when they emerge from the eggs.

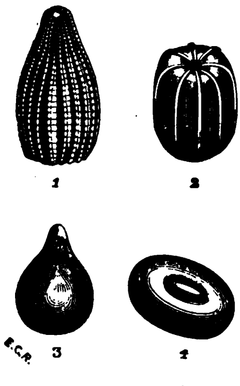

Fig. 5.—1, Egg of *Pieris brassicæ;* 2, ditto, *Vanessa urticæ;* 3, ditto, *V. polychloros;* 4, ditto, *Selenia illunaria,*—all highly magnified.

Having stated the rule of life of a Lepidopterous insect, it may be well to furnish a few special instances as examples, and first let us glance at the metamorphoses of *Pieris brassicæ,* the Large White Butterfly.

The parent butterfly deposits

her eggs in little clusters on the under side of the leaves of cabbages. (Eggs are generally laid on the *under* side of leaves, as being more protected from the weather and from the sun.) These eggs are elongate, and pale yellow. After an interval of a week or ten days, the small caterpillars creep out of these eggs, and commence feeding on the cabbage leaves; these caterpillars have sixteen legs, six of which, towards the head, are hard and horny, and correspond to the six legs of the perfect insect; behind these are the eight ventral and two anal-

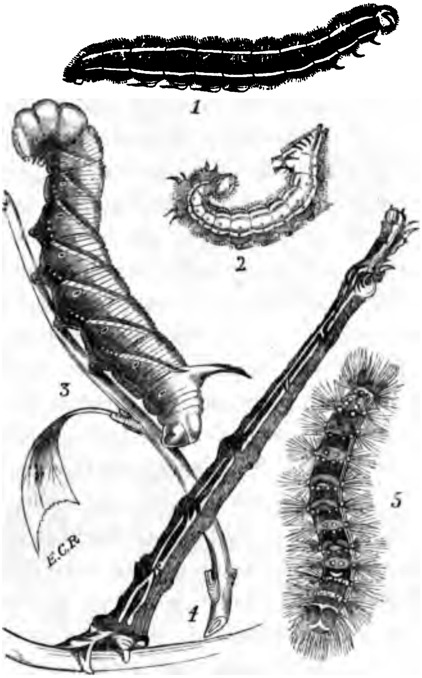

Fig. 6.—1, Larva of *Pieris brassicæ;* 2, ditto, *Lophopteryx camelina;* 3, ditto, *Sphinx ligustri* (young); 4, ditto, *Ourapteryx sambucaria;* 5, ditto, *Diphthera Orion.*

fleshy prolegs, by means of which the larvæ have great power of holding on to any substance on which they are resting. These caterpillars feed voraciously, and soon have grown to such an extent that it is necessary to cast off their skins. When the period for this approaches they cease feeding, and seem dull and stupid. They fix themselves firmly by their hind legs, and in a short time the skin behind the head cracks, and the larva gradually wriggles its way out of the opening, and walks off, leaving behind it the old empty skin sticking to the leaf. The larva, when thus freshly moulted, is already considerably larger than the skin from which it has escaped; but it is soft and tender, and it has to wait a little time for its new skin to harden; but when that has happened, it sets to work vigorously, and eats with renewed appetite. After spending some days in the happy state of alternately eating and sleeping, it has again to go through the process of casting its skin—a process which is repeated four or five times before the larva is full fed.

When quite full fed, the larva crawls away from the plant on which it has been feeding, and creeps up a wall or paling till it finds a convenient nook adapted to its purpose; it then spins a bit of silk very firmly to the wall or paling, and fastens its hind legs in this silk, and then it passes a narrow belt of silk round the middle of its body, making both ends fast to the wall or paling. These silken fastenings are generally so placed that the larva is in a perpendicular position, with its head upwards; it then curves the anterior portion of its body a little, and rests quietly waiting for the change that is to come over it. In a day or two the skin of the caterpillar cracks towards the head, and is pushed down inside the belt and towards the tail, whence eventually it drops to the ground; and what is left attached to the wall is a curiously angulated creature, having no resemblance whatever to the larva which crept up the wall. This creature is the chrysalis or pupa, devoid of eyes, mouth, legs, and capable of no motion whatever except a slight wriggling of the hinder segments.

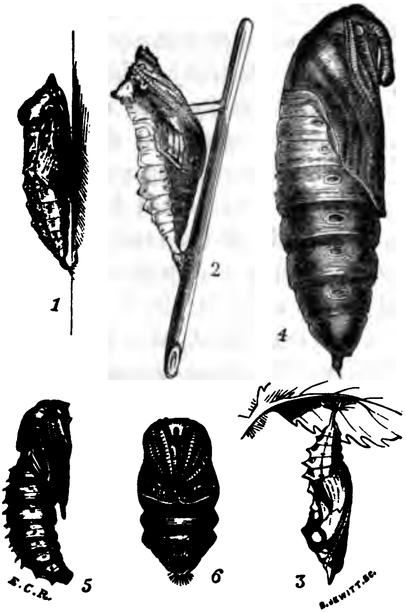

Fig. 7.—1, Pupa of *Pieris brassicæ;* 2, ditto, *Papilio machaon;* 3, ditto, *Vanessa urticæ;* 4, ditto, *Sphinx ligustri;* 5, ditto, *Sphecia apiformis;* 6, ditto, *Saturnia pavonia-minor* (male).

If this change has taken place in the month of September, the chrysalis remains unchanged till the following spring; but some time in the last fortnight in April, if the weather be warm, the final change takes place, and the skin of the upper portion of the chrysalis cracks, and the butterfly crawls out and takes up a fixed position on the wall, whilst its wings grow. When first grown they are quite soft and limp, but the butterfly waits quietly till they have attained the proper degree of firmness, and then takes flight, to disport in our gardens and fields, and rejoices the heart of the entomologist, as the "first White Butterfly" is a true harbinger of summer.

To turn now to another common but very beautiful insect, the Peacock Butterfly (*Vanessa Io*). In this species, the parent butterfly lives through the winter, and comes out from its retreat in the warm sunny days of spring, just when the stinging-nettles are putting up their young shoots. The parent butterfly deposits her eggs on the under side of the terminal leaves of one of these shoots, depositing a considerable number (if not her whole store) on a single plant. In the course of a week or two these eggs hatch, and there creep out little black caterpillars. These commence gnawing the under side of the nettle-leaf, and then spin a slight web so as to form a common tent over the whole community; in a short time they crawl out from this tent, to feed on the adjoining leaves, but whilst they continue small they generally return to the interior of the tent in the evening, and remain there till the following morning.

These larvæ grow rapidly, and cast their skins several times. They completely defoliate a number of stinging-nettles in the vicinity of that on which they were hatched. From the larvæ being spiny and black, with numerous very small white dots, when congregated in some numbers on the upper part of a stinging-nettle, they are tolerably conspicuous. When the larvæ are quite full fed, they prepare for the final change. For this purpose, each larva seeks some firm object—a post, the trunk of a tree, or the main stem of a stinging-nettle,—and spins a small surface of silk, into which it fastens its hind legs in such a position that the head hangs downwards; it then curves the anterior part of its body, and waits for the change to come over it. In due course, the skin of the larva cracks, and is gradually shoved upwards to the extreme tail, whence eventually the larval skin drops off, and we have in its place the angulated pupa, suspended simply by the tail. This change probably takes place in the month of July, and in about three weeks' time the perfect insect is completely developed within the chrysalis; and, the chrysalis skin cracking, the butterfly makes its escape, expands and dries its wings, and flies to the china-asters and other flowers of our gardens, to display its glorious beauties.

To turn now to the transformations of the Wall Butterfly (*Lasiommata Megæra*). In this case, the parent butterfly deposits her eggs almost singly on the leaves of several grasses. If the eggs are deposited in the months of August and September, they are hatched in a few days, and the small, pale green larvæ which creep out of them proceed to feed on the leaves of the grass. The small green larvæ grow very slowly, and their movements are very sluggish. Like all the larvæ of the *Satyridi*, they have a bifid tail, two small peaks projecting from the last segment. By the middle of October they are about half an inch in length, and then cease feeding for the winter; but in February, if the weather be mild, they wake up from their winter sleep, and again begin feeding on the grass leaves. About the end of April, or beginning of May, they are full fed, and then, spinning a piece of silk to a grass stem or some neighbouring object, fasten their hind legs in it, and hang with the head downwards and the anterior portion of the body rather curved. In a couple of days the skin cracks, and is pushed upwards towards the tail, and the much shorter, stouter-looking object which remains is the chrysalis. In two or three weeks the colouring beneath the thin wing-cases of the chrysalis clearly shows that the butterfly is nearly developed, and, the chrysalis skin cracking, the butterfly creeps out, and, having expanded and dried its wings, flits before us along the road, settling from time to time either on the ground or amongst the herbage.

Thus, in the examples already given, we have instances of butterflies which pass the winter in the pupa state, or as hybernating perfect insects, or in the larva state.

We turn now to a consideration of the metamorphoses of the common Blue Butterfly (*Polyommatus Alexis*). If the parent butterfly deposits her eggs in September, the larvæ soon hatch, but remain small through the winter, and do not begin to feed up till the spring. The eggs are deposited on the leaves of clover and bird's-foot trefoil (*Lotus corniculatus*), and if in the month of April we stoop down and examine these plants, we may probably meet with a curious woodlouse-shaped creature, about half an inch in length, of a rather dark green, clothed with short brown hairs, giving it a velvety appearance; along the sides are some short oblique blackish streaks; the head and legs are placed completely under the body, and quite out of sight: this would be the larva of our common Blue Butterfly. Towards the end of April it is full fed, and spins some silk, in which it fastens its hind legs, and then passes a silken belt round the middle of its body, and in due course the larval skin cracks and the butterfly crawls out, expands and dries its wings, and disports itself in fields and lanes, —a beautiful, though common, object.

Enough has now been said about metamorphoses of butterflies, and we therefore turn to the Hawk-moths, or Sphinges; and let us, in the first place, consider the transformations of the Six-spot Burnet Hawk-moth (*Anthrocera filipendulæ*). The eggs are deposited amongst clover and bird's-foot trefoil at the end of July, or early in August. In a short time the larvæ are hatched, and commence feeding on the leaves of clover, etc., but they grow very slowly, and whilst still quite small, they cease feeding for the winter; in the spring they commence feeding again, but it is not till quite the end of May or beginning of June that they are full fed. They are then nearly an inch in length, very fat and soft-looking, pale yellow, inclining to greenish at the sides, with numerous large black spots, and the black head is entirely retractile within the second segment. This larva then prepares for its change to the pupa state; for this purpose it spins a complete, opaque covering of silk, termed a cocoon; the cocoon is elongate, pointed at each end, of a pale yellow colour, and is generally attached to a stem of a plant in a vertical position. Within this cocoon, quite concealed from view, the larva undergoes its change, and becomes a brown-black chrysalis. In about three weeks' time the chrysalis pushes itself through the upper part of the cocoon, so that nearly the anterior half of the pupa projects, and then the skin cracks, and the Burnet Hawk-moth creeps out and ascends the stem to which the cocoon was attached, and proceeds to expand and dry its wings. In a few hours it takes wing, and flies with a straight, heavy flight in search of flowers, from which it delights to suck the honey, in the brightest sunshine.

Next let us notice the transformations of the Privet Hawk-moth (*Sphinx ligustri*). The parent moth deposits her eggs on the leaves of privet and lilac, at the end of June or early in July. In a week or ten days the larvæ are excluded, and proceed to feed on the leaves of the privet or lilac; they are smooth, green, with a pointed horn towards the tail; they grow rapidly, and in three or four weeks' time have attained a length of more than two inches, and are then remarkably handsome—being of a bright green, with sloping white streaks on the sides, bordered above with lilac streaks, and the caudal horn is black above, with the under side of the lower half yellow; when not feeding they erect their anterior segments in a curved position, supported only by the ventral and anal prolegs. When quite full fed, they are nearly three inches in length. Then the colours of the body become dull, and the larva ceases to feed, descends to the ground, and after wandering about a little, buries itself in the ground to a depth of several inches. It then forms a subterranean chamber, and there undergoes its change to the pupa state; the larval skin cracks, and is pushed off towards the tail end, and the dark brown pupa remains as the tenant of the subterranean chamber. This change has probably taken place about the middle of August; and the buried pupa remains there quietly throughout the autumn, winter, and spring, but when the month of June comes round, the pupa prepares for its last change. It forces its way up to the surface of the earth, and then its skin cracking, the Privet Hawk-moth makes its escape, and proceeds to expand and dry its wings. In the evening it takes flight, and with its large, strong wings and powerful muscles is able to fly with extreme speed; it hovers over flowers, from which, with its long tongue, it extracts the sweets, and then darts away almost with the velocity of light, to hover again over other flowers.

Now let us turn to the transformation of one of the smaller Clear-winged Hawk-moths (*Trochilium culiciforme*). The parent moth deposits her eggs in June in the stumps of felled birches, or in growing birch-trees. From these eggs are hatched small whitish larvæ, which feed in the bark and in the wood of the birch. These larvæ grow very slowly, and continuing in the larva state all through the winter are not full fed till the following spring. Towards the end of April the larva constructs a cocoon near the opening of its burrow in the birch stem, and changes therein to the pupa state; and about the middle of May, if we have warm weather, the pupa protrudes its anterior half through the end of the cocoon, and the skin cracking, the perfect insect makes its escape, and proceeds to expand and dry its wings. In a short time it takes flight, and delights to bask on flowers in the hottest sunshine, ever and anon flying swiftly away to a different spot.

We will now consider the transformations of a larger wood-boring insect (*Cossus ligniperda*), the Goat Moth. The parent moth deposits her eggs in July, in crevices in the trunks of willows, oaks, and other trees. In a short time these eggs hatch, and the larvæ proceed to eat the wood of the tree, forming large excavations in the substance of the trunk. These larvæ grow slowly, and it is reputed to pass at least two winters in the larva state within the tree. The growing larvæ are rarely seen, but occasionally, when a tree is cut down, it is found to be infested with these larvæ of various sizes. About twenty-six or twenty-seven months after the eggs were deposited, the larvæ are full fed, and many of them at that time quit the trees where they have fed, and may be seen crawling on the ground,—disagreeable-looking objects, with a very unpleasant odour. The larva is then three inches long, flesh-coloured at the sides, dark, dingy red on the back, with the head black. Those which are thus at large enter the earth, to pass there their last winter in the larval state; but many do not quit the trees, and change in their burrows to the chrysalis state. When the chrysalis is ready for its change, it forces itself along the burrow to the surface of the tree, and projects its anterior portion, then the chrysalis skin cracks, and the imprisoned moth creeps out, ascends the trunk of the tree a few inches, and there expands and dries its wings. It is rather a sluggish insect, but may be found at rest on the trunks of the trees which it has inhabited when in the larva state.

Let us next consider the transformations of the Puss Moth (*Cerura vinula*). The egg is deposited by the parent moth, in May, on the leaves of willows and poplars. The larvæ hatch from these eggs in a few weeks, and feed on the leaves of the willows and poplars. They are comical-looking creatures, with two tails sticking out behind, and with little protuberances on each side of the head, like ears; and, as when annoyed they raise up the head and also the hinder segments, holding on only by the ventral prolegs, they have a very grotesque appearance. From each of the two tails they can protrude a fleshy filament of a pink colour, and it is supposed this peculiar apparatus is with the view of driving away ichneumon-flies, to the attacks of which these larvæ are much exposed. The larva grows slowly at first, but after the second moult it makes more rapid progress, and when it is a little more than half-grown it loses the ear-like appendages to the head, and is a much less quaint-looking object than the younger larva. When nearly full fed, it seems to lose the power of protruding the caudal filaments. The full-grown larva is more than two inches long, dark green, with a broad purplish-brown blotch along the back, and reaching partially down the sides. It then loses its fresh green colour, and seems turning to a dull purple. This is a sign it is ready for its change, and it proceeds to spin its cocoon. Having powerful jaws, it bites off some pieces of wood, and mixes a sort of wood-paste and silk together in forming its cocoon, which is of a dark-brown colour, and so hard that it is not easily cut with a knife. Within this cocoon it changes to the pupa state; this probably happens towards the end of August, and the pupa remains quiescent throughout the winter and spring, till the month of May arrives. Then the pupa skin cracks, and the moth, by the aid of some solution which it discharges, softens the end of the cocoon, and, pushing itself forward, makes its escape, and, crawling up the trunk of the tree, proceeds to expand and dry its wings. The perfect insect may often be noticed in the daytime sitting on palings or trunks of trees.

Let us next consider the transformations of the Figure-of-Eight Moth (*Diloba cæruleocephala*). The parent moth deposits her eggs at the end of September or beginning of October. Early in the spring following, these eggs are hatched, and the caterpillars which come from them proceed to eat the leaves of hawthorn or sloe. The larvæ grow quickly, and in a few weeks have become very conspicuous objects, being of a pale yellow, with a broad band on each side, which is either of a slaty-blue or pale green; they are very plump and soft-looking. About the end of June they are full fed, and then spin a rather firm, whitish cocoon, in which they undergo their change to the pupa state. About the middle or end of September, the perfect insect bursts the pupa skin, pushes through the cocoon, and comes forth to expand and dry its wings. It flies swiftly at dusk, and is frequently attracted by light, and enters our rooms in warm evenings at the end of September.

Now let us turn our attention to the Buff-tip Moth (*Pygæra bucephala*). The parent moth deposits its eggs about the middle of July. It deposits a considerable number together, near the terminal leaves on the branches of lime, oak, and various other trees. The larvæ soon emerge from these eggs, and proceed to eat in company the terminal leaf, and then proceed to the next leaf, gradually stripping the twig on which they are at work. When the larvæ are young, we frequently find twenty or thirty employed on a single leaf, so that it is not surprising that the leaf soon disappears. We can readily detect their presence as we walk along, by their excrement, which we see lying on the ground, and by the leafless ends of the branches, which we see overhead against the sky. Sometimes they occur in such plenty that the oak bushes in the hedges are stripped perfectly bare in the month of September. The larva is not beautiful: it is of a dull yellow, with a broad black dorsal line, and with three black lines on each side; the head and legs are black; it is slightly downy, and remarkably limp. Towards the end of September the larvæ are full fed, and, descending from the trees, may be seen wandering about on the ground, which they then enter, and descend to the depth of two or three inches. There they undergo their change to the pupa state, and remain quietly till the month of June comes round: then the pupa pushes itself upwards to the surface of the ground, and, the skin cracking, the imprisoned moth escapes, and, crawling up some neighbouring object, proceeds to expand and dry its wings. It is a very handsome insect, very sluggish in the daytime, and may often be noticed on palings, or sitting in the grass. It often enters houses, being attracted rather freely by light.

Let us next glance at the transformations of the Vapourer Moth (*Orgyia antiqua*). The female deposits her eggs in autumn on the outside of her cocoon. As the young larvæ, when hatched, have frequently to wander in search of food, it is providentially arranged that they eat almost anything. In our gardens we perhaps most frequently find them on rose bushes; we generally first notice them in June, and from that time we have a constant succession of them. These larvæ are among the most curious and beautiful larvæ that we have; the ground colour is blackish spotted with pink, but they are covered all over with tufts of hair. In the first place, there are two long blackish tufts behind the head, which point forwards, giving it a long-eared appearance; then towards the tail end is another long blackish tuft, pointing backwards; then on four of the middle segments there are ochreous tufts on the back, and two of these segments have also tufts on the sides. The larva when full fed spins a rather firm whitish cocoon, and in it undergoes its change to the pupa state. In about two or three weeks, according to the heat of the weather, the final change takes place: the pupa skin cracks, the moth creeps out, and if it is a male it proceeds to expand and dry its wings; if, however the moth should be a female, the wings do not grow after its exclusion from the pupa; they are extremely small and rudimentary—moreover, the female moth has a very large body, quite disproportionate to that of her partner; the female is therefore not locomotive: she sits heavily on the outside of her cocoon, waiting for the male. The male, on the other hand, is one of the most lively moths we have; in the most sultry weather in August he may be seen flying in a series of irregular circles in the daytime; and as few moths are more plentiful in London than this, he may often be seen threading his way along the crowded streets. The male is intently searching for the female, who, unable to fly, is waiting quietly to be found out. The males of this species, and some other allied species, are endowed with peculiar powers of detecting their own females; they will even enter houses where they are, and congregate round the boxes in which they are imprisoned. Collectors take advantage of this habit, and when they succeed in rearing a female which has these powers of attraction they take her to the natural haunts of the species, and thus frequently obtain a considerable number of specimens of the other sex.

Now let us consider the transformations of the Tiger Moth (*Arctia caja*). The parent moth deposits her eggs at the end of July or in August; the eggs are hatched in a short time, and the small hairy caterpillars crawl out and commence feeding on chickweed, dock, nettle, or other low plants. They grow very slowly, and before they are half an inch long they cease feeding for the winter. In the month of April they commence feeding again, and now make up for their long fast by eating voraciously. They soon require to cast their winter skin, and each time they moult they appear with longer hairs, so that by the time they cast their skin for the last time they are really very handsome. The full-fed larva is about two inches long, black, with reddish-brown hairs along the sides and on the anterior segments, and with long white hairs on the back. When disturbed, the larva rolls itself up in a ball like a hedgehog, and protected by its long hairs it can then fall without injury. The full-fed larvæ may often be seen wandering about (they can crawl very fast) in search of a convenient nook in which to spin their cocoon. The larva commences by spinning a few outer threads for the support of the cocoon, and then commences the cocoon itself, into which it spins the greater part of its own hairs, so that by the time the cocoon is nearly completed, if we were to examine the larva it would look very much as if it had been shaved. The larva then undergoes its change to the pupa state, and in four or five weeks the pupa skin cracks and the moth creeps out, and proceeds to expand and dry its wings. The rich colouring of the moth must always strongly impress any one seeing it for the first time.

Let us next briefly consider the transformations of the Drinker Moth (*Odonestis potatoria*). The eggs are deposited in August; these are hatched in a few weeks, and the caterpillars commence feeding on grasses. They feed sparingly at intervals throughout the winter, but are still comparatively small in the spring; but after the end of March they feed more voraciously and grow rapidly, so that by the middle of May or early in June they are full fed. They are then two inches long of a dull bluish-grey, with a line of orange spots on each side of the back, and with short white tufts of hair along the spiracles. The larva then spins an elongate opaque cocoon, pointed at each end, and changes therein to the pupa state.

This larva, though not clothed with long hair, is yet one of those of which the hairs are very apt to irritate the skins of some individuals, producing a kind of nettle-rash which is extremely unpleasant. The larvæ which are most objectionable in this respect are the Oak Eggar (*Lasiocampa quercus*), the Fox (*L. rubi*), and the Drinker (*Odonestis potatoria*) and the Gold Tail (*Porthesia auriflua*) when about to moult, the hairs being then rigid and brittle. At other times the larva of the Gold Tail, which is remarkably handsome, may generally be handled with impunity. But as these hairy larvæ affect different persons in different ways, each entomologist must ascertain for himself those larvæ he should avoid. The risk in tearing open the cocoon of one of these larvæ is considerably greater than in handling the larva itself, from the rigid brittle nature of the hairs, which are spun into the cocoon.

Five or six weeks after the Drinker has assumed the pupa state, the skin cracks, and the moth makes its escape, and ascending some neighbouring object proceeds to expand and dry its wings. It flies swiftly at evening, and often enters houses attracted by light, when its noisy gambols on the ceiling at once announce its arrival.

Now let us turn to another group of moths, and consider the transformations of the Common Yellow Underwing (*Triphæna pronuba*). The eggs are deposited in July and August; in a few weeks these hatch, and the larvæ commence feeding on dock, chickweed, and other low plants. During the daytime they conceal themselves amongst leaves close to the ground, often going underground, and at night they come out to feed on the plants; in gardens we may find them by examining primrose and polyanthus plants with a lantern. They feed throughout the winter, growing slowly, and are full fed about the month of April; then they bury themselves deeper in the earth, and there undergo their change to the pupa state. About the beginning of June the pupa pushes itself up to the surface, and then the skin cracking, the moth makes its escape, and proceeds to expand and dry its wings. This moth is extremely active with its legs, and can run quickly directly it has made its escape from the pupa.

Now let us consider the transformations of the Silver Y Moth (*Plusia gamma*). Of this there are two broods in the year, and probably more in very warm summers. If we take the case of eggs deposited in June, their career will be as follows:—The eggs hatch in a few days, and from them proceed small green larvæ, which in walking have this peculiarity that they hunch up a portion of their body. This arises from the legs on two of the segments, which usually possess legs, being absent; hence the larva in walking elevates or loops this portion of its body, so as to bring the prolegs of the hinder segments nearer to the true legs of the anterior segments. These larvæ, which are very omnivorous, feed on all sorts of plants, and we often find them in our gardens on petunias or geraniums. They do not go underground, but simply hide themselves on the under side of the leaves in the daytime; they grow quickly, and are soon full fed, when they spin a slight white cocoon amongst the leaves of the plant on which they are feeding, and change therein to the pupa state. In a fortnight or three weeks the pupa skin bursts, and the moth comes out and proceeds to expand and dry its wings. It flies at all hours of the day, but most freely at evening dusk, when they may often be seen buzzing by dozens at the flowers of petunias, verbenas, etc.; a clover field in blossom is almost sure to furnish a number of them.

Let us now consider the transformations of *Biston hirtaria.* The parent moth deposits her eggs at the beginning of May; these eggs soon hatch, and the young larvæ crawl out. These are veritable loopers, having only ten legs—the six true legs near the head, and the anal prolegs and one pair of ventral prolegs at the other end of the body; so that the larva in walking arches the central part of its body in the effort to bring the hind legs close up to the fore legs, thus forming a good imitation of the Greek letter Ω. From the appearance that one of these larvæ has of measuring the ground as it proceeds, the name of geometers (earth-measurers) has been given to the extensive family of moths which have ten-legged larvæ. These larvæ feed voraciously on elm and various other trees, and when not feeding they frequently fasten themselves firmly by the hind legs to a branch, and raise the anterior legs off the surface, so as to place the entire length of the body of the larva at a considerable angle to the branch, which is firmly grasped by the hind legs. In this position it so precisely resembles a withered twig, that even an experienced collector has frequently to touch the larva in order to satisfy himself whether it is a bit of stick or not. The full-fed larva is about two inches long, brown, with yellowish spots, and with two small humps on the penultimate segment. It then buries itself in the ground, and there undergoes its change to the pupa state; and at the end of April or beginning of May, the pupa forces its way to the surface of the earth, and the pupa-skin cracking the moth creeps out, and proceeds to expand and dry its wings. We may often see it sitting on palings and trunks of trees, and it is particularly plentiful in the gardens of the London squares.

Let us now glance at the transformations of *Ephyra pendularia.* The eggs are deposited by the parent moth in August on the twigs of birch-trees; these soon hatch, and the small looping larvæ which come from them proceed to feed on the birch-leaves. The larva grows rapidly, and in about a month's time is full fed; it is rather variable in colour, smooth, with the head slightly bifid. It does not enter the ground or spin a cocoon, but fastens its anal prolegs to some silk which it spins on a twig of birch, and passes a silken girdle round its body, and then changes to a pupa, which thus resembles in its habits the pupa of the common White Butterfly. It remains thus all through the winter, and in the following month of May the pupa-skin cracks, and the moth creeps out and proceeds to expand and dry its wings.

Next let us consider the transformations of the large Magpie Moth (*Abraxas grossulariata*). The parent moth deposits her eggs in August on currant-bushes, sloe-bushes, etc. etc.; the eggs are soon hatched, and the little looping larvæ begin feeding on the leaves of currant, sloe, etc. They feed, however, slowly, and are still quite small when they cease feeding for the winter, and remain without eating till the young leaves begin to expand in the spring of the following year. In April and May, however, they feed voraciously and grow rapidly. The full-grown larvæ are about an inch long, rather stout, smooth, white, dotted with black. At the end of May or beginning of June they spin a slight amount of silk underneath a leaf, and fastening themselves in it, change to the pupa state. In about three weeks' time the pupa-skin cracks, and the moth comes out and proceeds to expand and dry its wings. It is a sluggish, slow-flying insect, but is very conspicuous from its large white wings, spotted with black, and may be often noticed in gardens towards evening.

Let us now consider the transformations of the Winter Moth (*Cheimatobia brumata*). The parent moth deposits her eggs in the months of November and December, frequently on hawthorn or apple; in the early spring as soon as the hedges begin to have a greenish tinge, but before the leaf-buds are fully expanded, these eggs hatch, and the small looping larvæ begin feeding on the young unexpanded leaves, eating a number of holes in them. They are sometimes extremely injurious from their numbers to apple-orchards and even to hawthorn hedges. A few years ago I had about fifty yards of a hawthorn hedge eaten perfectly bare by the larvæ of this insect, and the larvæ feeding on the young unexpanded shoots cannot be expelled by shaking or beating. When they attack apple-orchards in numbers the entire crop may be lost. About the end of May these small green looping larvæ are full fed, and then descend below the surface of the earth, where they undergo their change to the pupa state. About the middle of November the pupa comes to the surface, and the skin cracking the moth escapes, and crawling up the hedge or tree-stem, proceeds to expand and dry its wings. It is, however, only the male which has developed wings; the female has the wings no larger than when it first emerges from the pupa, and is therefore incapable of flight. On a mild November evening the males may be seen flying along the leafless hedges by hundreds, and if we examine the hedges with a lantern we shall see the subapterous females sitting on the twigs.

Now let us consider the transformations of the Small Magpie Moth (*Botys urticata*). The parent moth deposits her eggs, in July, on stinging-nettles. The eggs are soon hatched, and the glassy-looking larvæ, furnished with sixteen legs, proceed to feed on the leaves of the stinging-nettle, which they wrap partially round them. In a few weeks the larvæ are full fed, and in the course of the month of September they go into winter quarters. They seek the crevices under the loose bark of trees, or creep into hollow stems, and there spin a slight transparent cocoon, in which the larva remains unchanged till the following spring; but towards the end of April it changes to the pupa state, and about six weeks afterwards the pupa-skin cracks, and the moth creeps out and proceeds to expand and dry its wings. The moth may often be seen flying along weedy banks, or hovering amongst stinging-nettles.

To turn now to the transformations of *Simaëthis pariana*. The parent moth deposits her eggs in July on the leaves of apples. These eggs are soon hatched, and produce small glassy larvæ, furnished with sixteen legs. They feed on the upper side of apple leaves, spinning a slight web over themselves, and curving the two edges of the leaf upwards, bringing them nearly together. The larvæ feed up rather rapidly and are of a pale grey-green, with a broad yellowish dorsal line and conspicuous black spots. When full fed they spin a very thick elongate white cocoon, in which they undergo their change to the pupa state, and in two or three weeks the lively little moth makes its appearance, and proceeds to expand and dry its wings; we often see it in gardens on the flowers of China asters, coreopsis, etc., in the daytime during the months of September and October.

Now to consider the transformations of one of our very small moths, *Lyonetia Clerckella.* The parent insect deposits her eggs on the leaves of apple and cherry trees. The larvæ burrow into the leaves, and live their whole lives between the two skins of the leaf. By eating the inner substance of the leaf, and progressing forward in the leaf as they feed, they form long slender, serpentine tracks. When the larvæ, which are elongate and have sixteen legs, are full fed, they come out of the leaf and spin a few silken threads on the under side of a leaf, amongst which they suspend themselves in a horizontal position, so that they are not in contact with the leaf, and there undergo their change to the pupa state. In about a fortnight or three weeks the pupa-skin cracks, and the little white moth creeps out and hastens to expand and dry its wings.

Let us now consider the transformations of one of the Plume Moths (*Pterophorus fuscus*). The egg is deposited by the parent moth in July on plants of *Veronica Chamædrys.* The eggs are probably hatched in a few weeks, and the larvæ probably after feeding for a short time, lay up for the winter. On this point my information is deficient, and I have therefore to supply it by conjecture. In the month of May of the following year the larvæ feed eagerly and grow rapidly, and by the end of the month the hairy, stout, sixteen-legged larvæ are full fed; then they fasten the hind legs to a stem of the plant, and undergo the change to the pupa state. The pupa is smooth, attached only by the tail to the stem of the plant. In two or three weeks' time the pupa-skin cracks, and the moth comes out, and very soon expands and dries its wings. It may often be seen flying in the afternoon and evening on grassy banks, where its food plant, the *Veronica Chamædrys*, is plentiful.

In conclusion of this chapter we will just glance at the transformations of the Twenty-plume Moth (*Alucita polydactyla*). The parent moth deposits her eggs at the end of May on the undeveloped flower-buds of the honeysuckle. When these eggs hatch, the larvæ creep into the honeysuckle buds and feed within the unopened buds on the stamens and pistil. The larva is quite smooth, furnished with sixteen legs, and when full fed it spins a slight silken cocoon in which it changes to the pupa state. In a few weeks' time the moth emerges from the cocoon and speedily expands and dries its wings, and it may often be seen fluttering about honeysuckles, and not rarely it enters houses, and we see it on our windows.

CHAPTER III.

ON THE HABITS OF BUTTERFLIES AND MOTHS.

It is well known that butterflies remain quietly at rest during the night, and are only to be seen on the wing in the daytime; indeed, bright sunshine is needed to arouse many into a life of activity, and we all notice that in a sunless summer we are little cheered by the sportive gambols of butterflies.

Gardens, fields, woods, and lanes are the places for butterflies,—a meadow at the edge of a wood, or an open glade in a wood, being the best localities. There in the summer time from soon after sunrise till about 5 P.M. a constant succession may be seen settling on flowers of thistles, brambles, etc., to extract their sweets.

After 5 P.M. few butterflies will be noticed on the wing, and then the only chance is of finding them at their sleeping places. Some of the Little Blues and the Small Copper may be found sleeping on the flowers of rushes in sheltered places, and the female Orange Tip may frequently be found asleep on the umbels of the wild chervil (*Anthriscus sylvestris*).

The neighbourhood of London is far less prolific in butterflies than it used to be, and the collector needs to go further into the country, which, thanks to the numerous railways, he can easily do.

Some species are only found on chalk or limestone soils, the larvæ feeding only on flowers that grow in such localities, others prefer sand. The very best places for collecting in the south of England are on the edges of the greensand and chalk formations, where you have the advantage of all the species attached to both soils.

The handsome Swallow-tail Butterfly is only now to be obtained in the still undrained fens of Cambridgeshire and Norfolk. The Clouded Yellow Butterflies frequent lucerne and clover fields in the south of England. In some seasons they are tolerably common, but in ordinary seasons they occur but seldom. The Marbled White Butterfly (*Arge Galathea*) is extremely local, but generally very plentiful wherever it does occur. The bold flying *Hipparchia Semele* frequents stony places on heaths, and at the borders of woods.

Amongst our British butterflies we have but two mountain species, *Erebia Blandina* and *Cassiope*. The former occurs in many parts of the north of England and Scotland, not at great elevations; *Cassiope,* on the other hand, occurs further up the mountains, and sometimes in great profusion. *Cænonympha Davus,* though often found on boggy mountain-tops, occurs also on low mosses and moors, but has not hitherto been found with us south of Derbyshire.

One of the most graceful of our butterflies is the White Admiral (*Limenitis Sibilla*). It occurs only in a few woods in the south of England. The Purple Emperor (*Apatura Iris*) is more generally distributed, though also confined to woods in the south of England;

it delights to fly over the summits of lofty oaks. It is extremely pugnacious, and if another approaches the spray on which one of these sylvan monarchs is seated, a contest ensues and the two battle, rising in the air sometimes to a considerable elevation. The Purple Emperor sometimes descends to the ground to drink from a muddy pool, but a dead rabbit nailed to a tree will prove a most attractive bait for this splendid insect.

The Painted Lady (*Cynthia cardui*) is another butterfly of uncertain appearance; in some years it is tolerably common all the country over, but sometimes years may elapse without our meeting with it. The Comma (*Grapta C album*) is common in certain parts of the west and middle of England. Three of the species of *Vanessa*—namely, the Red Admiral (*V. Atalanta*), the Peacock (*V. Io*), and the small Tortoise-shell (*V. urticæ*)—are common garden insects; and in August and September the two former may often be seen displaying their beauties on China asters and other flowers. The Camberwell Beauty (*V. Antiopa*) is on the other hand a great rarity in this country, though it has occurred singly in a great variety of localities from Cumberland to the Isle of Wight.

The large Fritillaries are all handsome wood-frequenting insects, of powerful flight, soaring over the trees, and descending in the glades to suck the honey from flowers. The small Fritillaries frequent woods that have been thinned, where the underwood is still low. One of our Fritillaries (*Argynnis Lathonia*) is a rarity, and few entomologists have had the pleasure of seeing it alive in this country. The concave hind margin of the anterior wings will attract the attention of the observant entomologist even whilst the insect is on the wing.

The Hair-streak Butterflies delight to fly along country lanes, settling from time to time on the bushes and trees. The Purple Hair-streak (*Thecla quercus*) is not unfrequently found in the localities frequented by the Purple Emperor.

Of the blue butterflies, the common Blue (*P. Alexis*) is very generally distributed, occurring in every lane and meadow throughout the country. On sandy heaths *P. Ægon* is equally plentiful. In chalky localities we meet with the loveliest of all our blues, *P. Adonis*, also *P. Corydon*, and *P. Agestis*; the Scotch form of the latter insect (*P. Artaxerxes*) is to be found on the slopes of many Scotch hills amongst *Helianthemum vulgare*. Of the Skippers, some, as *Thymele alveolus*, *Pamphila sylvanus*, and *P. linea* are common wood-insects; whereas *Thanaos Tages* and *Pamphila comma* are most frequently observed on the dry slopes of chalk-hills. *Pamphila Actæon* still occurs in its head-quarters at Lulworth, in Dorsetshire, and we trust those who go in search of it will remember to leave a few to keep up the brood.

Of the *Sphinges*, or Hawk Moths, the Foresters and Burnets frequent dry grassy slopes, flying heavily in the sunshine. The species of the genus *Smerinthus* (the Eyed Hawk Moth, the Poplar Hawk Moth, the Lime Hawk Moth) fly at dusk, but in the daytime they may frequently be noticed at rest on palings or on the trunks of trees. The true *Sphinges* (*S. convolvuli* and *S. ligustri*) fly with extreme velocity at evening dusk, and with their long tongues extract the honey from tubular flowers, without settling on them, whilst poised in the air above them. The species of the genera *Deilephila* and *Chærocampa* have similar habits.

The Humming-bird Hawk Moth buzzes in a similar way at the flowers of honeysuckle, etc., in the bright sunshine, as well as in the evening; and the two Bee Hawk Moths are likewise diurnal in their habits. The Clear-winged Sphinges of the genera *Sphecia* and *Trochilium* are rarely seen on the wing, but may be observed at rest on the trunks of trees, on flowers, or on leaves.

In the tribe of moths termed *Bombycina*, the Swifts (*Hepialus*) fly at dusk; the Ghost Moth (*H. humuli*) and the Golden Swift (*H. Hectus*) have a peculiar oscillating flight, keeping at one spot, as though attached to an invisible pendulum. The other Swifts (*H. lupulinus, velleda, sylvinus*) fly with extreme rapidity, with an irregular, mazy flight near the surface of the ground. The Wood Leopard and the Goat Moth are rarely noticed on the wing, but may be found at rest on the trunks of trees and on palings. The Wood Leopard, from its conspicuous contrast of colours, is very liable to be picked up by small birds, and we often find on the ground the wings of devoured specimens.

The Pale Prominent (*Pterostoma palpina*) may be noticed at times at rest on palings, and sometimes it enters houses, attracted by the light. The Swallow Prominent (*Leiocampa dictæa*) may be frequently observed at rest on the trunks of willow-trees; and in the first half of May *Lophopteryx carmelita* may be occasionally found on palings or trunks of trees.

The various species of Footmen (*Lithosidæ*) fly in the dusk of evening, and may be sometimes met with in the daytime by beating the branches of trees on which they repose. The pretty *Philea irrorella,* when caught, drops down in the net as though dead.

In the handsome family of *Chelonidæ*, two, the Clouded Buff (*Euthemonia russula*) and the Wood Tiger (*Nemeophila plantaginis*), are complete day-fliers, and several, like the Cream-spotted Tiger (*Arctia villica*) fly readily in the afternoon; others fly at dusk or after dark. Amongst the *Bombycidæ*, the Oak Eggar (*Lasiocampa quercus*) is a true day-flying insect, whereas the nearly-related Fox Moth (*L. rubi*) flies a little before dusk; both have a very bold flight, swooping in circles, and the males fly vigorously in search of the females; most others of the family fly after dusk, and come readily to light.

The handsome Kentish Glory (*Endromis versicolora*) flies swiftly by day in the first half of April, frequenting woods. The showy Emperor Moth (*Saturnia Pavonia-minor*) is so freely obtained in the larva state that the imago is rarely collected.

The species of the family *Platypterygidæ* all fly at dusk; and one of them, *Cilix spinula*, is very common, flying along lanes at the end of May, with a wild, irregular flight; others may be occasionally startled from their haunts by beating bushes, in the afternoon. The insects of the family *Psychidæ* are peculiar in this respect; in the first place, the larvæ construct portable cases, which they carry about with them all their lives, and in which they change to the pupa state; and, in the second place, the females are wingless. The females of the genus *Fumea* possess legs and antennæ, and sit on the outside of the case awaiting the arrival of the males. The females, however, of the genus *Psyche* are far more helpless; they never quit the case, have neither legs nor antennæ, but are worm-like sacks, and literally egg-bags. In this genus the males are extremely vivacious and restless, and those who breed a male of *Psyche nigricans* must promptly secure him after his escape from the chrysalis, or he will soon batter himself to pieces.

It has lately been observed that several of the females of the genus *Orgyia,* which occur in the south of Europe, approximate in their habits to these females of *Psyche,* having short and useless legs, and not emerging from their cocoons. (See 'Journal of the Linnean Society of London,' Zoology, vol. vi., p. 156–164, "On the Abnormal Habits of some Females of the genus *Orgyia.*")

In the great tribe of *Noctuina,* or Night-flying Moths, we meet with several individual species which fly freely in the daytime, such as *Leucania conigera,* which may be seen buzzing at flowers in the daytime; *Charæas graminis,* flying over heaths at all hours of the day; *Miana furuncula,* which flies in numbers in the afternoon; *Celæna Haworthii,* which flies both in the afternoon and evening; *Agrotis porphyrea, A. lucernea, Triphæna Ianthina* and *T. interjecta.* All the species of *Heliothis* fly by day and also at dusk, whereas the species of *Anarta* are true sunshine-lovers, and the little *Heliodes arbuti* is never seen on the wing except in full daylight. All the pretty little Noctuæ which constitute the section *Minores* are day-fliers, and *Plusia gamma* and *P. interrogationis* are freely on the wing both day and night. The species of *Toxocampa* are also true day-fliers, and the showy *Catocala nupta* flies freely in the daytime, but is also on the wing after dark; *Euclidia Mi* flies in meadows in the daytime, *E. glyphica* in open places in woods, and *Phytometra ænea* may be noticed disporting itself on heaths.

The remainder of the large group of *Noctuina* are at rest in the daytime, and must be sought for on palings or trunks of trees. The species of *Bryophila* may be found on walls; *Polia chi* on the stone walls of our midland and northern counties; and the curious *Dasypolia templi* takes shelter under heaps of stones, to reward the patience of those who carefully turn them over one by one. The night-flying species may be taken buzzing at flowers, or flying along hedges,—those which have light-coloured hind wings attracting most readily our attention. There are two special devices for obtaining them, light and sugar, which will be mentioned more in detail in a subsequent chapter.

In the large group of *Geometrina*, many species fly very readily in the daytime, but some only do so then when disturbed, flying of their own accord at dusk and after dark. A very much larger proportion, however, of these insects are on the wing before dark than in the group of the *Noctuina*. Those species which naturally rest in the day, such as *Phigalia pilosaria, Nyssia hispidaria, Biston hirtaria,* the Oak Beauty (*Amphidasis prodromaria*), the Peppered Moth (*A. betularia*), the Waved Umbre (*Hemerophila abruptaria*), and the species of *Boarmia* and *Tephrosia,* may be found sitting on palings or trunks of trees. Many others rest on the leaves of trees and bushes, and these may often be dislodged and made to fly by beating the branches where they are concealed. The common heath-flying *Fidonia atomaria,* and the clover-frequenting *Strenia clathrata,* as also the species of *Aspilates,* are regular day-flying insects. The wingless females of the *Hybernidæ* must be looked for on palings or trunks of trees, in the daytime, or sitting on the twigs of hedges after dark.

The group of *Pyralidina* are nearly all ready to fly in the daytime; some, as the Purple-and-Gold (*Pyrausta punicealis*), the Silver-barred Sable (*Ennychia cingulalis*), and their allies, are true sun-lovers, sporting themselves on flowers in the hottest sunshine. The *Hydrocampidæ* are all water-frequenting insects; the larvæ feeding below the surface of the water on aquatic plants, such as duck-weed, water-aloe, water-lily, and pond-weed. The perfect insects may be found flying over the surface of ponds and sluggish streams towards evening. Many of this family frequent weedy hedgebanks or open places in woods, and are readily started from their places of repose by the approach of the collector. The Nettle-tap (*Simaëthis Fabriciana*) abounds among stinging-nettles, flying freely in the daytime, with a peculiar, mazy flight.

In the Crambideous section of the *Pyralidina*, the species of the genus *Eudorea* rest in the daytime, on the trunks of trees or palings; *Aphomia colonella*, of which the larva occurs in the nests of humble-bees, flies freely at dusk; most of the Knot-horns (*Phycidæ*) also fly at dusk, though some may be readily started from the herbage in the daytime: the night-flying species come very readily to light. The species of the genus *Crambus* occur amongst grass or moss; one pretty species (*C. falsellus*) being partial to the moss which grows on walls or old thatched roofs, and the perfect being often found flying over such localities at dusk. Nearly all the genus fly very readily in the daytime; we see them start up at our feet as we walk across a field; they fly a few yards before us, and settle again on a grass stem, to be again disturbed by us in our progress, but most of the species fly more continuously at dusk, and that they fly long after dark is shown by the number that are attracted by light on a still summer's night. The species of the genus *Chilo* occur in marshy places and the edges of ponds,—all feeding, in the larva state, on aquatic plants.

In the extensive group of *Tortricina* we meet with a few species which delight to fly in the blazing sunshine, such as *Anchylopera comptana, Hemerosia Rheediella, Semasia Ianthinana, S. nanana, Eucelis aurana, Stigmonota internana, Asthenia strobilella, Grapholita ulicetana,* and *Cnephasia nubilana.* The last-named species swarms by hundreds on hawthorn hedges, and *G. ulicetana* is equally plentiful amongst furze bushes; but the great bulk of this family fly towards dusk. If we look along a hedge on a summer's evening we shall be perfectly amazed at the prodigality of insect life shown by the countless myriads of *Tortricina* dancing in endless mazes along the hedge. Some, however, are more sluggish in their habits, and are rarely to be seen on the wing. We may perhaps see them sitting on flowers or on the stems of plants.

In the extensive tribe of the *Tineina,* we have many instances of day-flying species. Those of the genus *Ochsenheimeria* fly between noon and two P.M., low, amongst grass. *Incurvaria masculella* flies in the sunshine along hedges; and all the species of *Adela* and *Nemotois* fly in the brightest sunshine over flowers. The species of *Micropteryx* are also sun-loving insects; and *Swammerdamia pyrella* flies quite freely in the afternoon. The gay-looking *Harpella Geoffrella* and *Dasycera sulphurella* delight to fly in the early morning hours. *Pancalia Lewenhoekella* flies briskly among flowers in grassy places in the sunshine; and the species of *Acrolepia* are often to be seen flying of their own accord in the afternoon. The species of the genus *Glyphipteryx* are all freely on the wing in the bright sunshine, and it is pleasant to see the neat little *G. equitella* flying over the flowers of Stonecrop (*Sedum acre*) and *G. Fischeriella* hovering over and settling on the flowers of Umbelliferæ; whilst the larger *G. Thrasonella* we are sure to see amongst rushes flying from tuft to tuft, and then pausing awhile to fan itself, as though the heat of the summer's day were almost insupportable. Merry little day-fliers are the brilliant and shining species of *Antispila* and *Tinagma*. In the genus *Gracilaria* we may often see that garden pest *Syringella* flying freely in the daytime, and some of the genus *Ornix* are sure to be seen active on the wing as we walk along a hedge in early summer. Though most of the genus *Coleophora* are quietly at rest during the day, some of the tree-feeding species may be observed flying on the sheltered side of trees during the daytime; and in the genus *Elachista* many of the more brightly marked species may be noticed sporting in the afternoon sunshine, whilst those of more sober colours are freely on the wing before sunset. Few can have been so unobservant as not to have noticed as they walk along a grassy lane in the evening at the beginning of May, little white moths threading their way amongst the grass close to the hedgebank, pausing on a grass blade for a moment, and then going forward again; these are the males of *Elachista rufo-cinerea* flying in search of their partners. Early in the morning in May and August, many of the species of *Lithocolletis* and *Nepticula* may be noticed flying in the sunshine along hedges and near trees.

Very many species, however, of the *Tineina* repose during the day, sitting on trunks of trees, palings, in grass, or among bushes, and only come forward to gambol of their own accord in the dusk of evening.

Most of the Plume Moths (*Pterophorina*) fly freely in the evening, but may be readily started from flowers in the daytime as we walk along. The Common Plume, *P. pterodactylus*, attracts our attention as it sits on palings from its resemblance to the letter T, the anterior wings stretched out at right angles, concealing the hind wings, and appearing narrower than they really are, from being partially folded, and the legs being brought down close to the body, and at a first glance almost escaping observation.

The little Twenty-plume Moth (*Alucita polydactyla*) flies freely amongst honeysuckle in the evening, but when at rest during the day is a very inconspicuous-looking insect.

CHAPTER IV.

APPARATUS REQUIRED FOR COLLECTING AND PRESERVING BUTTERFLIES AND MOTHS.

Conceive a fine bright, warm day in May, the lilacs and laburnums in bloom in the garden, the hedges white with May-blossom, and the horse-chestnuts in all their glory; the fields yellow with buttercups, and the growing grass waving under the influence of a slight south-westerly breeze,—such a day that all nature seems happy and insects are enjoying and disporting themselves in all directions. There on the blossom of the lilac sits the Large White Butterfly; yonder in the field, amidst numbers of the Small White Butterfly, are specimens of the gay-looking Orange Tip; and Little Blues and Small Coppers settle on the flowers to display their charms to us.

Who does not wish to photograph this fleeting picture? If we gather the plants and dry them, their colours fade and their form alters, and it requires a strong effort of imagination when we see a dried flower in after years to remember what it looked like, when growing it waved to and fro in the wind, and wafted its scent towards us; but the insects may be preserved in all their freshness and all their glory for years, and every time we look at them, we shall be reminded of the entire scene in which we took them.

Let us therefore begin, and catch of these various butterflies that this pleasant May day has brought out. For this purpose we prefer a ring net—a ring about fifteen inches diameter, made of cane or metal, and fixed on to the end of a walking-stick, the ring bearing a net made of net, lino or book-muslin—of such length that the arm of the collector can just reach to the bottom, and the net must on no account terminate in a point, but its apex should be rounded, lest when any insects are caught they should be forced into the narrow end of the net, and there damage themselves in their efforts to escape.

Armed with this net, we sally forth, and catch an Orange Tip. But stop! what are we to do with it now it is caught? We must have with us a sufficient provision of pill-boxes into which to transfer the insects captured. Bringing the pill-box over the Orange Tip in question, as it flutters at the bottom of the net, we press the pill-box against the side of the net and then adroitly slip the lid on. Proceeding in this way we return to the house in a short time with sundry White Butterflies, two or three Orange Tips, some Little Blues, and one Small Copper.

To kill the insects so captured, take four dozen young laurel leaves (common laurel, not Portugal laurel), bruise them by hammering two at a time on a flat stone and cut them with a pair of scissors into small shreds, and place them at the bottom of a wide-mouthed jar (a glass jar with ground glass stopper is best). Into this jar drop the pill-boxes containing the captures, and close the jar tightly by the glass stopper or cork. In an hour or two according to the amount of active prussic acid in the laurel leaves, the insects will all be dead.*

The butterflies being now defunct, the next process is to pin them. Entomological pins, such as are in general use by British collectors, may be obtained of Messrs. Edelsten and Williams, 17, Silver Street, City, or of Messrs. Kirby, Beard, & Co., of 18, Cannon Street, City, the latter supplying the japanned pins which are so necessary for those insects which have a tendency to corrode the pins. However, for butterflies, the usual white entomological pins will be found to answer every purpose, and a most useful size is the No. 8 of Messrs. Edelsten and Williams.

Most butterflies, when turned out dead from the killing-bottle, will be found to have the wings meeting over the back, as we see them when sleeping on a flower. Perhaps, however, some one of the lot will have died with its wings expanded. If we turn it out on a rough tablecloth, with its upper side towards us, we take the pin and with it pierce the middle of the thorax, as nearly as possible in a vertical position. (The rough tablecloth is convenient in preventing the insect slipping away from us when we attempt to pin it, which it certainly would do were it on a smooth surface; if a rough table-cover is not at hand, we would recommend several thicknesses of blotting paper as furnishing a convenient surface on which to pin the insects.)

Then remove the butterfly sticking on the end of the pin to a piece of soft cork, and push the pin in till from a quarter to half an inch of the pin projects through on the under side of the butterfly—it is now pinned. In the case of those specimens which have died with their wings over their backs, however unwilling we may be to touch the specimens with our fingers—for every touch must cause a certain amount of injury—the simplest plan is to take the insect by the under part of its body, between the thumb and first finger of the left hand, and to hold it there whilst we stick the pin through the thorax.

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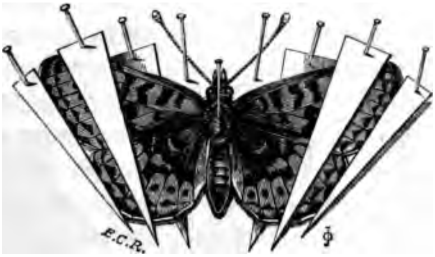
* A killing-bottle, if kept well corked or stoppered, will retain its efficacy for months. We have sometimes used them for two years before their virtue was quite exhausted.



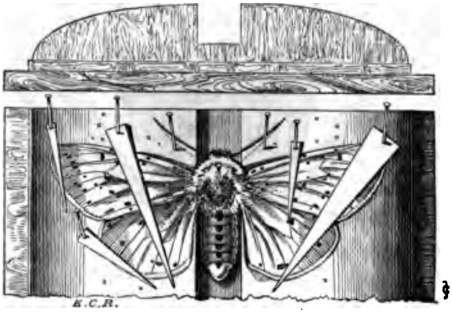
Butterfly (*Argynnis Euphrosyne*) set with upper and under braces.

The insect being pinned, has next to be set, and unless we place them in a relaxing-box on damp cork, they should be set out immediately, otherwise they very soon become stiff.

A setting-board may be made of a sheet of cork glued to a flat piece of wood, the surface of the cork being covered with paper. A number of stout pieces of card, cut in the form of elongate triangles, having stout pins stuck through their broader ends, form the braces which are used in setting out the wings of butterflies and moths. Place two of these on the setting-board, about an inch apart, but in a sloping position, like the outer strokes of the letter W, and these will serve for the under braces;

pin the insect midway between them, and then, with a setting-needle, hold out the wings whilst the upper braces are brought down upon them, taking care that the wings on each side are put out symmetrically, and that the ends do not turn up.

There are various elaborate contrivances for facilitating the labour of setting out butterflies and moths, and some entomologists have special corks rounded to the curve which they prefer for the wings, and with grooves for the bodies; those who adopt the plan of setting their specimens with the wings flat, have simply grooves cut for the bodies of the insects.



Section of cork setting-frame, and method of setting on ditto (*Spilosoma menthastri*).

Insects, when set out, require to be left on the setting-board two or three days, till they are quite stiff and dry, before the braces are removed. The setting-board should be kept in a box with a perforated metal side, and must on no account be left perfectly exposed, otherwise the collector's best specimens will be liable to the attacks of marauders, viz. mice, cockroaches, wasps, earwigs. Even shut-up insects, especially if left for any time on the setting-board, may suffer from the attacks of *Psoci*, or "dust-lice," generally, though improperly, termed *mites*.

When the insects are quite dry, they can be removed from the setting-board and be placed in store boxes preparatory to being placed in the collection. A collection may be kept in boxes or in a cabinet; perhaps it is as well to begin with boxes, and not to indulge in an expensive luxury like a cabinet till we have something to put in it. Store boxes, tight-fitting and corked top and bottom, are supplied by most dealers in entomological apparatus; they should be of sufficient depth, that when the insects are placed in them there may be no risk of the pins in the top coming in contact with those in the bottom of the box.

It is of extreme importance that a journal or diary be kept of all the captures made, and each specimen should bear a number referring to this journal, by means of which at any time the collector can ascertain precisely when and where such an insect was caught. Beginners sometimes have extraordinary luck, and catch rarities; and yet it may often happen that, having supposed this rarity was some common insect, they have misnamed it, and not discovered their mistake for years. Now, if the specimen bears a number referring to a journal written at the time of capture, when they discover the prize they have caught they can at once give the date and locality. What a mass of errors and blunders would have been avoided if every one had done this!

Our Continental friends use very much longer pins for their insects than we do, and one great advantage of this is, that they can attach to each insect a legible notice of its locality and date. If we, with our short pins, and with our insects in contact with the bottom of our cabinet drawers, attach any similar label, it is of sight, and we have to lift the insect up to see v and where it was caught. A collection in which insect could speak for itself, and say whence it came when captured, would be a vast improvement on of our existing collections.

CHAPTER V.

VARIOUS MODES OF COLLECTING.

THE collector of *Lepidoptera* is able, by means of two different devices, to obtain with comparative ease a vast number of species; these two modes may be briefly termed *sugar* and *light*. The system of *sugaring*, as now practised, dates only from the year 1842. Before that date, it is true, the partiality of night-flying moths had been observed, but we were gravely recommended to take an empty sugar hogshead and place it in the vicinity of a wood; *now* the collector carries in his pocket a tin-can filled with the sugaring compound, and by means of a painter's brush spreads it on the trunks of those trees that seem to him best adapted for his purpose. He does this just as it is getting dusk, and then, lighting his hand-lamp, proceeds to examine the sugar trees as darkness comes on; and if the evening be favourable to his pursuit, before two hours have elapsed he has his pockets well filled with *Noctuæ* taken "at sugar."

To make this sugaring compound, all that is required is coarse brown sugar, dissolved in water and beer till it is sufficiently thick but yet still fluid enough to allow of its being spread on the trunks of the trees by the painter's brush already mentioned; each evening, before leaving home, a teaspoonful of rum should be added, to improve the flavour of the compound.

When the hunting-ground is reached, the collector, having first ascertained the direction of the wind, will apply the sugar on the opposite or sheltered side of the trees, covering a strip of the surface of the trunk, about the level of his own eye, with the luscious compound. Some few drops of the sugar are sure to trickle downwards, and the object being to sugar as many trees as possible in a limited time, it does not answer the collector's purpose to stop too long at a single tree. Trees at the edge of a roadway, or path through a wood, or on the borders of a heath, are often very productive, and if trees happen to be scarce in the selected hunting ground, the sides of palings, wooden posts, rocks, and stones may be made use of; the foliage of young fir-trees is also handy for sugaring in default of larger objects. When a sufficient area has thus been covered with the sugar, the collector lights his bull's-eye lantern, and proceeds to examine critically the sugared stems. Many of the *Noctuæ* which come to the sugar sit there sluggishly, and may be easily boxed; others are more wary, and sit with their wings half raised, ready for instant flight, so that the collector has to be prepared with his net; and the *Geometridæ,* which occasionally come to the sugar, are generally very much on the alert. Some few of the smaller tribes of moths may not unfrequently be found also at the sugar, but it is the *Noctuina* which are the chief votaries, and which come in the greatest numbers. Twenty or thirty on a single tree is no unusual sight, but then the probability would be great of their being nearly all common species.

To the inexperienced, a few words of caution are necessary. Sugar does not prove always equally attractive: in spring, when the sallows are in bloom; in summer, when the lime-trees are in blossom, and in autumn, when the ivy is in bloom, these natural sweets compete with our artificial mixture, and it is better to seek on them for the insects which visit them nightly in troops. A dull, balmy evening at the end of March or beginning of April, will often enable the collector visiting the sallows to reap a rich harvest from the various species of *Noctuæ* regaling thereon; and in July, when the lime-trees are in blossom, if a position be taken where the moths can be seen against the clear evening sky, they can be readily captured as they come flying to the lime blossoms. In October the ivy blossom should be carefully examined with a lantern, and the autumnal *Noctuæ* will be found busily engaged in sucking the juices from the flowers.

Mr. Barrett has lately called attention, in the pages of the 'Entomologist's Monthly Magazine' (vol. iii., p. 113), to the partiality of moths for blackberries, and the mode in which some species swarm on the flowers of *Glyceria fluitans* and other grasses, has already been noticed more than once.

That moths are attracted by *light* is a fact sufficiently familiar to most people, but the experienced collector wishes to develope a systematic mode of availing himself of the partiality of moths for light. To do so with effect depends very much on the situation and adjuncts of the collector's residence; if in full sight of a wood or heath, or of only an ordinary piece of country landscape, he may reasonably expect success, but this method of collecting is more costly than sugaring.

In the first place, the collector should be provided with two argand lamps, one of which is to be placed outside on the window-sill of the room, the other inside the room on a table opposite the open window; the outer lamp attracts the moths from all directions, and when they are opposite the window they are attracted by the inner one into the room.

On very still evenings, an argand lamp will burn out-of-doors without protection well enough, but if there is wind—even a very little—it will be very soon blown out, and therefore it is desirable to have it enclosed in some case or frame, so that while the light streams out from it the wind may be kept away from it.

Next, two particular points have to be borne in mind:—1st. You cannot collect by light on bright moonlight nights. You must notice when the moon rises and sets, and light up accordingly. 2nd. You cannot collect by light if your window faces the wind, for moths fly against the wind; and if the wind is west you must put your light on the east side of the house, or if the wind is east you must have your attracting room on the west side of the house.

Moths begin to come to light as soon as it gets dark, and continue coming for some time; indeed, occasional stragglers will come throughout the night; the collector might, therefore, with advantage remain in his collecting room till daybreak, ready to secure every specimen the moment it appeared, for some only remain for a short time in the vicinity of the light and then fly away, and others which remain quietly enough half the night fly away before daybreak. However, if the collector does not wish to sacrifice his whole night's rest at the shrine of science, let him go to bed about midnight, and let him revisit his collecting room an hour or two before daybreak to secure any specimens which have come in during the night.

On some nights moths come veritably in troops to the light—*Bombyces, Noctuæ, Geometræ, Pyrales, Tortrices, Tineæ,* and *Pterophori,*—it is a mad race which shall come in; but these gala nights are very scarce—sometimes there will not be above three such nights in a year; and here is shown the necessity of the collector, who wishes to attract insects by light, attending *systematically,* for the good nights cannot be distinguished by our senses from the bad ones, and if he only lights up now and then, instead of regularly, he will be almost sure to miss the good nights. I once knew a continuous fortnight of good nights.

When the small *Psychodæ* come in great numbers, so as to blacken the windows and ceiling of the collecting room, it is almost an infallible sign that the moths are coming in numbers.

Those who have not opportunities of collecting by light from their own windows must console themselves, if they live in suburban localities, by visiting the gas lamps. A graphic account of the pleasures of collecting moths at gas-lamps, from the pen of Mr. Barrett, will be found in the 'Entomologist's Monthly Mazagine' (vol. iii. p. 42).

It is by no means improbable that beneficial results might ensue from taking a good light apparatus into a wood, in which case it might be desirable to place the light upon some white surface, such as a sheet, so as to increase the dazzling surface which is to operate on the optic nerves of the woodland moths. The American moth-trap, described in the 'Entomologist's Monthly Magazine' (vol. ii., p. 199), is constructed on a principle which seems theoretically perfectly correct; but on a very "good" night it might become so filled with moths that they would mutually spoil one another.

In some species of the *Bombycina*, if the collector be fortunate enough to breed a female moth, he may obtain any number of male specimens by simply taking the female to a locality in which the insects occur. This is best shown, perhaps, in the genus *Lasiocampa*, all the males in that genus "assembling," as the phrase is, very vigorously. In the genus *Orgyia* the apterous females may be turned to a similar profitable account. Individual instances will occur of other moths, not of the *Bombycina*, being apparently attracted in numbers by means of a female specimen. Once I found a dozen or more of *Smerinthus tiliæ* in a summer-house in which a female specimen of that insect had recently emerged from the pupa. On another occasion I found a cluster of eight or nine specimens of *Mania maura* in an outhouse actually overlapping one another. Other entomologists could probably furnish analogous instances from their own recollections.

Further, it must never be forgotten that many species are best obtained in the larva state, and the faculty of finding larvæ is best acquired by constantly searching for them. Larvæ resemble, sometimes very closely, the substances on which they feed, and though we may often obtain them in quantity by the simple use of a beating-stick, yet it is worth spending a little extra time to find them by the eye, as by so doing we have a better chance of learning something of their habits.

Of late years, much (indeed, thanks to the Rev. J. Hellins, I may say *very* much) has been done in rearing moths from the egg, and species for which we might have waited long enough before *finding* the larvæ, have thus been observed through all their stages.

In rearing larvæ, it is essential that they should be kept supplied with fresh food; plants keep fresh by being placed in water (in which case the larvæ only too frequently crawl down the stem into the water and so drown themselves), or by being shut up in tight-fitting tins or glass vessels; in the latter case a few larvæ might live together comfortably, but if too many be placed together in a tight-fitting vessel suffocation may ensue.

It has been well remarked by Dr. Knaggs when treating of "the caterpillar state" in his 'Notes on Collecting' (Entomologist's Monthly Magazine, vol. ii., p. 38), that "many an entomologist, who has of late years devoted both time and energy to 'breeding,' as it is termed, will bear me out in the statement that it is, perhaps, the most deeply interesting of all the charming occupations to which the student of entomology is liable; for whether we regard it in an instructive point of view, or pursue it from the simple love of contemplating creation's wonders, or whether we have an eye merely to quantity and quality of 'specimens,' it is, in either case, an equally profitable employment.'"

BUTTERFLIES.—RHOPALOCERA, 66.

1. PAPILIONIDÆ, 11.
    Papilionidi, 1.
    Pieridi, 10.
2. NYMPHALIDÆ, 29.
    Satyridi, 11.
    Nymphalidi, 2.
    Vanessidi, 7.
    Argynnidi, 9.
3. ERYCINIDÆ, 1.
4. LYCÆNIDÆ, 18.
5. HESPERIDÆ, 7.

MOTHS.—HETEROCERA, 1910.

I. SPHINGINA, 38.

1. ZYGÆNIDÆ, 7.
2. SPHINGIDÆ, 14.
3. SESIIDÆ, 3.
4. ÆGERIDÆ, 14.

II. BOMBYCINA, 105.

1. HEPIALIDÆ, 5.
2. ZENZERIDÆ, 3.
3. NOTODONTIDÆ, 27.
4. LIPARIDÆ, 12.
5. LITHOSIDÆ, 17.
6. CHELONIDÆ, 14.
7. BOMBYCIDÆ, 11.
8. ENDROMIDÆ, 1.
9. SATURNIDÆ, 1.
10. PLATYPTERYGIDÆ, 6.
11. PSYCHIDÆ, 6.
12. COCHLIOPODIDÆ, 2.

III. NOCTUINA, 316.

1. NOCTUO-BOMBYCIDÆ, 9
2. BRYOPHILIDÆ, 3.
3. BOMBYCOIDÆ, 15.
4. LEUCANIDÆ, 30.
5. APAMIDÆ, 46.
6. CARADRINIDÆ, 7.
7. NOCTUIDÆ, 50.
8. ORTHOSIDÆ, 34.
6. COSMIDÆ, 8.
10. HADENIDÆ, 46.
11. XYLINIDÆ, 19.
12. HELIOTHIDÆ, 10.
13. ACONTIDÆ, 3.
14. ERASTRIDÆ, 3.
15. ANTHOPHILIDÆ, 3.
16. PHALÆNOIDÆ, 2.
17. PLUSIDÆ, 11.
18. GONOPTERIDÆ, 1.
19. AMPHIPYRIDÆ, 4.
20. TOXOCAMPIDÆ, 2.
21. STILBIDÆ, 1.
22. CATEPHIDÆ, 1.
23. CATOCALIDÆ, 4.
24. OPHIUSIDÆ, 1.
25. EUCLIDIDÆ, 2.
26. POAPHILIDÆ, 1.

IV. GEOMETRINA, 282.

1. OURAPTERYDÆ, 1.
2. ENNOMIDÆ, 21.
3. AMPHIDASIDÆ, 6.
4. BOARMIDÆ, 21.
5. BOLETOBIDÆ, 1.
6. GEOMETRIDÆ, 8.
7. EPHYRIDÆ, 6.
8. ACIDALIDÆ, 34.
9. CABERIDÆ, 6.
10. MACARIDÆ, 5.
11. FIDONIDÆ, 17.
12. ZERENIDÆ, 5.
13. LIGIDÆ, 1.
14. HYBERNIDÆ, 6.
15. LARENTIDÆ, 132.
16. EUBOLIDÆ, 11.
17. SIONIDÆ, 1.

V. PYRALIDINA, 167.

1. HYPENIDÆ, 7.
2. HERMINIDÆ, 7.
3. ODONTIDÆ, 1.
4. PYRALIDÆ, 5.
5. CLEDEOBIDÆ, 1.
6. ENNYCHIDÆ, 8.
7. ASOPIDÆ, 2.
8. STENIADÆ, 4.
9. HYDROCAMPIDÆ, 5.
10. BOTYDÆ, 28.
11. NOLIDÆ, 5.
12. CHOREUTIDÆ, 4.
13. EUDOREIDÆ, 17.
14. GALLERIDÆ, 4.
15. PHYCIDÆ, 35.
16. CRAMBIDÆ, 34.

CHLOEPHORIDÆ, 3.

VI. TORTRICINA, 2

1. TORTRICIDÆ, 36.
2. PLICATÆ, 59.
3. ANCHYLOPERIDÆ, 3
4. PERONEIDÆ, 21.
5. STIGMONOTIDÆ, 46.
6. CARPOCAPSIDÆ, 19.
7. CNEPHASIDÆ, 13.
8. SERICORIDÆ, 22.
9. LOZOPERIDÆ, 45.

TORTRICODIDÆ, 1.

VII. TINEINA, 669

1. EXAPATIDÆ, 6.
2. TINEIDÆ, 69.
3. MICROPTERYGIDÆ,
4. HYPONOMEUTIDÆ, 1
5. PLUTELLIDÆ, 18.
6. GELECHIDÆ, 173.
7. ŒCOPHORIDÆ, 32.
8. GLYPHIPTERYGIDÆ,
9. ARGYRESTHIDÆ, 28
10. GRACILARIIDÆ, 28.
11. COLEOPHORIDÆ, 59.
12. ELACHISTIDÆ, 82.
13. LITHOCOLLETIDÆ, 4
14. LYONETIDÆ, 23.
15. NEPTICULIDÆ, 52.

VIII. PTEROPHORIN
29.

IX. ALUCITINA, 1

CHAPTER VI.

ON THE GROUPS AND FAMILIES OF BRITISH BUTTERFLIES AND MOTHS.

The British butterflies and moths may be tabulated as on the opposite page. The figures after the families and groups show the number of British species in each.

Of the differences between butterflies and moths (between the 66 Rhopalocera and the 1910 Heterocera found in this country) we have already spoken in the opening chapter. We now proceed to consider the nine groups into which the Heterocera are divided.

1. The SPHINGINA. This group, of comparatively small extent, is represented in this country by 38 species only.

In the structure of the antennæ, the Sphinges, or Hawk Moths, show their intermediate position between the butterflies and the true moths; the antennæ are fusiform, that is, thicker in the middle and attenuated at each end.

2. The BOMBYCINA. This extensive group, represented in this country by 105 species, comprises the true silk-producing insects, and many are remarkable for their beauty. The antennæ are thickest at the base, and then gradually taper; in most of the species they are

pectinated, and hardly longer than the thorax; the body is thick, rather short, and posteriorly obtuse; the posterior legs are scarcely longer than the middle pair; the wings are broad, the anterior have no typical markings (such as we find in the *Noctuina*), the posterior wings are brightly coloured, frequently more so than the anterior wings. The larvæ generally have sixteen legs, but never fewer than fourteen.

3. The NOCTUINA. This large group of night-flying moths comprises no less than 316 British species. The antennæ are setaceous, rarely pectinated, but not unfrequently ciliated; the body is moderately stout, attenuated posteriorly; the posterior legs are longer than the middle pair; wings of moderate breadth, the anterior wings rather long, adorned with typical markings (the stigmata and transverse lines varying only in intensity or sharpness of design), the posterior wings rather broad, generally of dingy colours. The larvæ generally have sixteen legs, but in a few genera they have only twelve.

4. The GEOMETRINA. This extensive group comprises 282 British species; many are very gaily marked, and some are of comparatively small size. The antennæ are setaceous, frequently ciliated or pectinated, and are longer than the thorax; the body is generally slender (in one or two genera the bodies are thick, and these insects might readily be mistaken for *Bombycina,* but their larval structure clearly shows that they are *Geometrina*); the wings are broad, of slight structure, and the posterior pair are brightly coloured, being generally exposed to view when the insect is in repose, in those species of which the anterior wings cover the posterior pair when the insect is at rest, the posterior pair

only show the rudiments of markings on the projecting inner margin. The larvæ have only ten legs, only a few species showing an additional pair of ill-developed ventral feet, hence their peculiar looping motion in walking.

5. The PYRALIDINA. This group, which is itself capable of being subdivided into two distinct sections (the Pyralideous and the Crambideous), contains 167 British species. The antennæ are setaceous, very rarely pectinated, more than twice the length of the thorax; the body is slender, elongated; the legs are long, the posterior pair longer than the others; the wings are rather long, triangular (in the Pyralideous section), or subparallel (in the Crambideous section), with moderately long cilia, the posterior wings adorned with markings (in the Pyralideous section). Larvæ with sixteen legs, generally glassy-looking.

6. The TORTRICINA. This extensive group comprises no less than 299 British species. The antennæ are setaceous, much longer than the thorax, very rarely ciliated; the body is moderately thick, posteriorly rather blunt; the wings are broad, with moderately long cilia; the anterior wings are somewhat truncate posteriorly, and often have the costa abruptly convex at the base; the posterior wings are rather broad, trapezoidal, without markings. The larvæ have sixteen legs.

7. The TINEINA. This group, which contains the smallest known forms of Lepidopterous insects, is very rich in the number of species, no less than 669 occurring in these islands. The antennæ are setaceous, rarely pectinated or ciliated, longer than the body; the body is slender; the wings are elongate, with long or very long cilia (the length of the cilia is probably the

most distinctive character of the *Tineina;* indeed there appears to be a gradual progression from the diurnal Lepidoptera, in which the cilia are shortest, to the *Pterophorina* and *Alucitina*), posterior wings sometimes of an elongate trapezoidal form, more frequently remarkably attenuated, without markings. The larvæ generally with sixteen legs, sometimes only with fourteen, in a few genera they are entirely apodal (with no legs).

8. The PTEROPHORINA. This group of Plume Moths is comparatively limited, and we have only 29 British species. The antennæ are setaceous; the body is slender, elongated, adorned with markings; the legs are elongate; the wings, which have long cilia, are divided, the anterior pair being bifid, the posterior pair trifid. In one genus, *Agdistis,* the wings are entire, but the place where the fissure should be is scantily clothed with scales.

9. The ALUCITINA. This group contains only a single British species. The antennæ are setaceous; the body is slender, short, adorned with markings; the wings have long cilia, each wing is divided into six.

We must now hastily glance at the various FAMILIES of the British Lepidoptera. In the butterflies, or Rhopalocera, we have five families represented in this country.

1. PAPILIONIDÆ. Imago with six legs, fitted for walking; larva elongate, cylindrical, smooth, or pubescent; pupa attached by the tail and by a belt of silk round the body.

This family includes the Swallow Tail, Brimstone, Clouded Yellows, and White Butterflies. We have 11 British species.

2. NYMPHALIDÆ. Imago, with only four legs fitted for walking, the anterior pair being rudimentary; larva

elongate, cylindrical, spiny, or with two horns at the head, or a forked tail; pupa suspended by the tail, with no belt of silk round the body.

This family includes the Marbled White, Speckled Wood, Meadow Brown, White Admiral, Purple Emperor, Red Admiral, Peacock, Tortoise-shell, and Fritillary butterflies. We have 29 British species.

3. **Erycinidæ.** Imago of the male, with only four legs fitted for walking, the female with six legs; larva short and onisciform, rather hairy; pupa attached by the tail, and with a belt of silk round the body.

We have but one British species, *Nemeobius Lucina.*

4. **Lycænidæ.** Imago, with six legs fitted for walking; larva short, onisciform; pupa attached by the tail, and with a belt of silk round the body.

This family includes the Hair-streaks, Coppers, and Blue Butterflies. We have 18 British species.

5. **Hesperidæ.** Antennæ inserted on each side of the broad head (thus widely separated); both sexes furnished with six legs of uniform size; body comparatively robust. Larvæ elongate, with the head large and the following segments narrowed. Pupa enclosed in a more or less transparent cocoon.

This family, of which the insects from their short, jerking flight have obtained the name of "Skippers," comprises seven British species.

Of the SPHINGINA, or Hawk Moths, we have four families—

1. **Zygænidæ.** Imago with the antennæ slender at the base, much thickened beyond the middle with scales only, or pectinated, never terminating in a hook; wings clothed with scales; anterior wings narrow; posterior wings rounded. Larva fat, sluggish, soft-looking, with no caudal horn.

This family includes the Forester and Burnet Sphinges. We have 7 British species.

2. SPHINGIDÆ. Imago with the antennæ slightly thickened in the middle, generally terminating in a hooked bristle; wings large, clothed with scales; anterior wings elongate and pointed, or with the hind margin indented. Larva firm, naked, generally with a horn on the back of the twelfth segment. Pupa subterranean.

This family includes all the large showy Hawk Moths, such as the Death's Head, the Ocellated, and the Privet Sphinx. We have 14 British species.

3. SESIIDÆ. Imago with the antennæ much thickened beyond the middle, terminating in a hooked bristle; wings short and comparatively broad; abdomen thick, with a broad tuft at the tip. Larva smooth, elongate, with a horn on the back of the twelfth segment. Pupa on the ground amongst leaves.

This family includes the Humming-bird Hawk Moth and the Bee Sphinges. We have only 3 British species.

4. ÆGERIIDÆ. Imago with the antennæ slightly thickened beyond the middle; wings narrow, elongate, transparent, only the margins and a central blotch being clothed with scales; abdomen rather long. Larva smooth, whitish (with no horn), feeding within the stems or roots of trees and shrubs, and changing therein to a pupa.

Of this family of the small clear-winged Sphinges we have 14 British species.

In the BOMBYCINA we have 12 families, represented here:—

1. HEPIALIDÆ. Imago with the antennæ extremely short, shorter than the thorax; wings distant at the base, elongate and somewhat lanceolate. Larva elongate,

naked, with a horny plate on the second segment, feeding on the roots of plants.

This family includes the Ghost Moth and the Swifts. We have 5 British species.

2. Zenzeridæ. Imago with the antennæ as long as, or longer than, the thorax; wings rather distant at the base; ovipositor of the female exserted. Larva naked, with a horny plate on the second segment, feeding in the woods of trees, or stems of reeds.

This includes the Wood Leopard and Goat Moths. We have 3 British species.

3. Notodontidæ. Imago with the antennæ longer than the thorax, pectinated in the male; abdomen thick, not gaily coloured; the thorax sometimes with bright markings (as in the Buff Tip); the anterior wings frequently with a projecting tuft of scales on the inner margin (whence the name of *prominent* moths applied to several of the species). Larva generally naked, frequently with projections on the back of the twelfth segment; many have the peculiarity of holding the hinder segments of the body erect when in repose; however, they vary much in form.

This includes the Puss and Kitten moths, the Lobster, the various Prominents, the Chocolate Tips and Buff-tip. We have 27 British species.

4. Liparidæ. Imago with the antennæ longer than the thorax, pectinated in the male; abdomen often very thick in the female, sometimes with a woolly anal tuft; anterior wings with no projecting tuft of scales on the inner margin. Larva hairy, generally with tufts of hair. Pupa hairy, generally with tufts of hair along the back, enclosed in a cocoon of slight texture.

This includes the Black Arches, Gipsy, Tussocks, Vapourers, White Satin, Brown Tail and Gold Tail moths. We have 12 British species.

5. Lithosidæ. Imago with the antennæ filiform in both sexes; the collar well developed; the thorax unspotted; the abdomen unspotted, but sometimes with pale belts and a pale tip; the anterior wings generally narrow. The rather hairy larvæ feed on lichens.

This family includes the Footman Moths. We have 17 British species.

6. Chelonidæ. Imago with the antennæ generally pectinated in the male, though sometimes filiform; the collar well developed; the thorax sometimes spotted; the abdomen gaily coloured and spotted; the wings gaily coloured and spotted, the posterior wings sometimes especially so. Larva hairy, but not with tufts of hair; generally polyphagous, feeding on low plants. Pupa smooth, enclosed in a cocoon.

This family includes the various Tiger Moths, the Clouded Buff, and the Ermine Moths. We have 14 British species.

7. Bombycidæ. Imago with the antennæ pectinated in the male, generally filiform in the female; abdomen not gaily coloured or spotted; the posterior wings are paler than the anterior wings, and have only faint markings. Larva hairy, not with tufts of hair. Pupa smooth, enclosed in a cocoon, which is sometimes of very firm texture.

This family includes the Eggars and Fox Moths, the Lackeys, Drinker, and Lappets. We have 11 British species.

8. Endromidæ. Imago with the antennæ pectinated in the male, only slightly pectinated in the female; the posterior wings slightly paler than the anterior wings,

but with similar markings. Larva smooth, with the twelfth segment thickened; pupa in a loose cocoon, beneath moss.

We have but 1 British species, the Kentish Glory.

9. **Saturnidæ.** Imago with the antennæ pectinated in both sexes; the wings broad, of similar colours and markings, each wing with an eye-like spot. Larva with short bristles, arranged like stars on the tubercles; pupa enclosed in a firm, pear-shaped cocoon, open at the narrow end, but with a protecting cap inside.

We have but 1 British species, the Emperor Moth.

10. **Platypterygidæ.** Imago with the antennæ of the male pectinated, of the female generally filiform; the abdomen slender in both sexes; the wings of small size, comparatively broad, sometimes hooked. Larva not hairy, with several little prominences on the back, with only fourteen legs, the anal prolegs wanting (as in the larva of the Puss Moth).

This family comprises the common little *Cilix spinula* and the Hook-tipped Moths of the genera *Platypteryx* and *Drepana*. We have 6 British species.

11. **Psychidæ.** Imago with the antennæ of the male pectinated, of the female simple or none; wings of the male broad, the female utterly wingless. Larva constructs a moveable case, in which it lives, and in which it changes to a pupa.

Of this family we have 6 British species.

12. **Cochliopodidæ.** Imago with the antennæ not pectinated, at the most slightly dentate; the wings rather short and broad, alike in both sexes, with rather long fringes. Larva smooth, onisciform, with no perceptible legs.—We have only 2 British species, *Limacodes testudo* and *Heterogenea asellus*.

In the NOCTUINA, we have 26 families represented in this country—

1. NOCTUO-BOMBYCIDÆ. Imago of moderate size; the body mostly smooth. Larva smooth, or with little eminences, living on trees or shrubs quite exposed, or between leaves united with silk.

This family includes the Peach-blossom, Buff-arches, the Figure-of-80, and the Yellow-horned. We have 9 British species.

2. BRYOPHILIDÆ. Imago of small size; the body slender, crested above. Larva smooth, the ordinary spots warty and shining, feeds on the lichens growing on walls, early in the morning.

Of this family, which includes the Marbled Beauty, we have only 3 British species.

3. BOMBYCOIDÆ. Imago of moderate size; the body thick, and sometimes crested above. Larva more or less tufted with hair, sometimes very hairy (so that we might readily mistake them for larvæ of *Bombycina*).

This family includes the Dagger Moths and the Miller. We have 15 British species.

4. LEUCANIDÆ. Imago small or of medium size; the body smooth, the anterior wings of pale colours, rarely with distinct markings. Larva elongate, feeding in stems, or merely concealing itself in such places.

This family includes the various Wainscot Moths. We have 30 British species.

5. APAMIDÆ. Imago small or of medium size, with the wings of dull colours, in repose roof-shaped; the markings are well defined, and the three stigmata generally distinct; the abdomen is generally smooth, sometimes crested. Larva thick, dull-coloured, generally shining, with the head small, retractile; living concealed,

either at the roots of plants or under the low herbage, or in stems.

This family includes the Light and Dark Arches, the Feathered Gothic, the Cabbage Moth, and the various species of *Apamea* and *Miana*. We have 46 British species.

6. CARADRINIDÆ. Imago of rather small size; the body smooth, the anterior wings rather oblong, with the lines and sometimes with the stigmata well marked. Larva short and thick, with short, stiff hairs; feeding on low plants.

This includes the common *Grammesia trilinea* and the various species of *Caradrina*. We have 7 British species.

7. NOCTUIDÆ. Imago of moderate size; the antennæ ciliated, pectinated, or only pubescent in the male; the anterior wings smooth or shining, narrow, overlapping one another a little in repose, giving the insect a peculiarly elongate appearance. They form a very flat roof. Larva thick, smooth, shining, or velvety, generally dull-coloured; feeding on low plants, and concealed either under leaves on the ground.

This family includes the Yellow-Underwing Moths of the genus *Tryphæna*, and the various species of *Agrotis* and *Noctua*. We have 50 British species.

8. ORTHOSIDÆ. Imago with the antennæ of the male pubescent or ciliated; the abdomen not crested, often flattened; the anterior wings more or less pointed at the tip; the two stigmata visible, and the lines distinct. Larva cylindrical, velvety, with no eminences; feeding on the leaves of trees or low plants, and concealed during the day.

This family includes the Chestnuts and the Satellite, and the various species of *Tæniocampa, Orthosia,* and *Xanthia.* We have 34 British species.

9. COSMIDÆ. Imago of moderate size; antennæ generally simple; abdomen smooth, slender in the male; anterior wings rather pointed at the tip; wings in repose, forming a very inclined roof. Larva elongate, bright-coloured, rather flattened beneath, living between united leaves of trees.

This family includes the species of *Tethea* and *Cosmia.* We have only 8 British species.

10. HADENIDÆ. Imago with the antennæ rather long; the abdomen more or less crested; the anterior wings thick, with the ordinary spots and lines; the subterminal line is never completely straight, and is often so deeply indented in its middle as to form the letter W. In repose, the wings form a very inclined roof. Larva elongate, smooth, not glossy; the spots not raised, the twelfth segment sometimes humped; feeding exposed or simply sheltered on trees or low plants.

This extensive family includes the Angle Shades, and the various species of *Hadena, Aplecta, Epunda,* and *Dianthæcia.* We have 46 British species.

11. XYLINIDÆ. Imago with the antennæ generally simple; the thorax robust; the collar often crested; the anterior wings oblong, with longitudinal markings; the ordinary transverse lines rarely distinct; wings rather folded in repose, forming a flattened roof, and giving the insect an elongate appearance. Larva cylindrical, elongate, smooth, generally of brilliant colours; living exposed on low plant or trees.

This family includes the Sword Grass and Shark Moths and the species of *Xylina.* We have now 19 British species.

12. Heliothidæ. Imago of moderate or small size; the antennæ not pectinated; the thorax stout; the abdomen smooth. Flight often diurnal. Larva cylindrical, not attenuated; feeding exposed on low plants, often preferring the flowers.

This family includes the Pease Blossom, the species of *Heliothis* and the Yellow Underwings of the genera *Anarta* and *Heliodes*. We have 10 British species.

13. Acontidæ. Imago with the antennæ slender, simple in both sexes; the abdomen smooth; the anterior wings thick, rather shining, in repose covering the posterior wings and forming a very sloping roof. Larva slender; rather swollen posteriorly with 12 or 16 legs, feeding on *Convolvulus*.

We have only 3 British species.

14. Erastridæ. Imago small, with the antennæ short, simple, the abdomen slender, generally crested; the anterior wings rather broad, often with the lines and stigmata well marked. In repose they form a very flat roof. Larva with 14 legs, half loopers, a little swollen posteriorly.

We have only 3 British species.

15. Anthophilidæ. Imago small, with the antennæ short and simple; the abdomen slender, smooth; the anterior wings thick; in repose forming a very inclined roof. Larva smooth, slender with 12 or 14 legs; feeding exposed on low plants.

We have only 3 British species.

16. Phalænoidæ. Imago with the antenna pubescent or ciliated; the abdomen slender, not crested, coarsely hairy; the anterior wings thick with the usual lines and the reniform stigma; the posterior wings are brightly coloured (orange). Larva smooth, elongate,

with 16 legs, but the two first pairs of ventral prolegs are short and useless in walking.

We have only 2 British species, *Brephos Parthenias* and *Notha.*

17. PLUSIDÆ. Imago with the antennæ filiform; the thorax with raised tufts; the abdomen crested; the anterior wings smooth, shining, often with metallic spots; in repose the wings form a very sloping roof. Larva with 12 or 16 legs, half-looping, attenuated in front; feeding exposed on shrubs or herbaceous plants. Pupa in a silken cocoon, not subterranean.

This family includes the Spectacle, the Burnished Brass, the Golden Y, and the Silver Y. We have 11 British species.

18. GONOPTERIDÆ. Imago with the antennæ short, ciliated in the male, the thorax with raised collar; the abdomen flattened and truncate in both sexes; the anterior wings broad, angular, and deeply indented. Larva smooth, with 16 legs; feeding exposed on leaves of trees.

We have only 1 British species, *Gonoptera libatrix.*

19. AMPHIPYRIDÆ. Imago of moderate or large size; the abdomen much flattened. Larva smooth, with 16 legs, attenuated in front.

This family includes the Mouse and Copper Underwing, with *Mania typica* and *maura.* We have only 4 British species.

20. TOXOCAMPIDÆ. Imago of moderate size; the thorax smooth, with a raised dark-coloured collar; abdomen smooth, rather flattened; the wings not dentate. Larva smooth, elongate, attenuated at each end, with 16 legs, the first two pairs of ventral prolegs rather short.

We have only 2 British species, *Toxocampa pastinum* and *T. Craccæ.*

21. Stilbidæ. Imago with the thorax smooth; the abdomen long, smooth, slender in the male; the anterior wings narrow, in repose partly overlapping and forming a very inclined roof. Larva smooth, cylindrical, thick; with 16 legs; feeding on grasses during the winter.

We have only 1 species, *Stilbia anomala.*

22. Catephidæ. Imago with the antennæ filiform and sometimes pubescent in the male; the thorax much crested; the abdomen more or less crested; the wings thick, rather dentate; the posterior wings often whitish or transparent. Larva elongate, with 16 legs; feeding exposed on trees.

We have only 1 British species, *Catephia alchymista,* of which a single specimen only has occurred; it was taken by Dr. Wallace, in the Isle of Wight, in September, 1858.

23. Catocalidæ. Imago of large size with the antennæ long, slender, pubescent in the male; the thorax slightly crested; the abdomen long, conical, slightly crested; the wings broad, thick, in repose forming a very flat roof; the posterior wings gaily coloured. Larva elongate, flattened beneath, and attenuated at each end, with fleshy filaments on the sides above the legs; feeding on trees, and resting attached to the trunks.

This family includes the Red Underwing, the Crimson Underwings, and the Clifden Nonpareil. We have only 4 British species.

24. Ophiusidæ. Imago of medium or large size, with the thorax robust; the abdomen smooth, more or less conical in the male; the wings thick, the anterior wings with the lines well marked. Larva smooth, elongate, with the anal legs and posterior ventral legs very long.

We have only 1 British species, the rare *Ophiodes lunaris*.

25. EUCLIDIDÆ. Imago of rather small size; the antennæ short, pubescent in the male; the thorax short, smooth; the abdomen short, slightly crested; the wings thick, with distinct lines and stigmata. Larva smooth, elongate, with only 12 legs; in repose coiling up the anterior segments; feeding exposed on low plants.

We have only 2 species, *Euclidia Mi* and *E. glyphica.*

26. POAPHILIDÆ. Imago of small size with the antennæ short and slender; the wings short and rather slender, the anterior wings with indistinct lines, but no spots. Larvæ slender, with 12 legs, looping, flattened anteriorly and posteriorly.

We have only 1 British species, the little *Phytometra ænea.*

In the GEOMETRINA, we have 17 families represented in this country.

1. OURAPTERYDÆ. Imago with the antennæ of the male simple; the abdomen rather stout, smooth; the wings ample, the posterior wings having the middle of the hind margin prolonged into a short tail. Larva elongate, with 10 legs with projections from the 8th and 12th segments.

We have only 1 British species, the Swallow-tail Moth.

2. ENNOMIDÆ. Imago with the wings generally ample and almost always dentate and angulated (the female always winged); the antennæ generally pectinated in the male, sometimes simple. Larva elongate, with 10, 12, or 14 legs (the additional legs rarely used in walking); often with humps.

This family includes the Brimstone Moth, the

Speckled Yellow, the Orange Moth, the Light Emerald, Barred Red, Lilac Beauty, and the various Thorns. We have 21 British species.

3. Amphidasidæ. Imago with the antennæ of the male plumose, or pectinated; the thorax generally woolly; the abdomen almost always stout; wings of the male ample; the female either wingless, or with rudimentary, or else with fully developed wings. Larva with 10 legs, elongate, smooth, not attenuated in front.

This family includes the Oak Beauty and Peppered Moths, with *Phigalia pilosaria, Biston hirtaria,* and the species of *Nyssia.* We have only 6 British species.

4. Boarmidæ. Imago with the antennæ of the male generally pectinated or ciliated, but never plumose; abdomen of the male long, and often slender; wings generally ample, often dentate, but never angulated. Larva with 10 legs, only humped on the sixth and twelfth segments.

This family includes the Waved Umbre, the Mottled and Willow Beauties, the Annulets, and the various species of *Cleora* and *Tephrosia.* We have 21 British species.

5. Boletobidæ. Imago with the antennæ of the male pectinated; the wings ample, concolorous, slightly dentate. Larva not humped, but rather bristly; feeding on lichens and fungi.

We have only one species, the rare *Boletobia fuliginaria.*

6. Geometridæ. Imago with the antennæ of the male often pectinated, the tip generally simple; the abdomen sometimes crested; the wings are green, generally entire, rounded or angular. Larva rather elongate, stiff, often rough; the head generally bifid, and

the second and anal segments frequently with two points.

This family includes the Large Emerald, the Essex Emerald, the Grass Emerald, and the Blotched Emerald. We have only 8 British species.

7. EPHYRIDÆ. Imago with the antennæ of the male pectinated, the tip filiform; the wings entire, of small size, the posterior wings slightly angulated, generally with an ocellated central spot. Larva elongate, with no humps; the head slightly bifid. Pupa truncate in front, attached (like a butterfly pupa) by a silken thread at the tail and a girdle round the body.

We have only 6 British species.

8. ACIDALIDÆ. Imago of moderate or small size, with the antennæ pubescent or sometimes slightly pectinated in the male, never plumose; abdomen slender, not crested; wings smooth, rather slender, generally entire, and generally with markings common to both wings, the posterior wings sometimes slightly angulated. Larva slender, not humped; feeding concealed on low plants, often preferring withered and decaying leaves.

This family includes the Small White Wave, the Small Fan-footed Wave, the Lace Border, the Cream Wave, the Ribband Wave and the Blood Vein. We have 34 British species.

9. CABERIDÆ. Imago of moderate size, with the antennæ sometimes pectinated in the male; the wings entire, rounded, generally white, with few markings. Larva rather long, not humped, posteriorly rather swollen.

This includes the White Wave and Clouded Silver. We have only 6 British species.

10. MACARIDÆ. Imago of moderate size, with the

antennæ of the male pubescent, rarely pectinated; the anterior wings generally with a prolonged tip, and an indentation below; posterior wings rather angular, sometimes dentate. Larva with 10 or 12 legs, sometimes bristly, sometimes with fleshy filaments or without these peculiarities.

This includes the Peacock Moth and the V Moth. We have only 5 British species.

11. Fidonidæ. Imago of moderate or rather large size, with the antennæ of the male generally pectinated, sometimes plumose; the wings entire, never angular; flight diurnal. Larva elongate, cylindrical, generally neither swollen nor humped, with two horizontal points from the anal segment.

This family includes the Latticed Heath, the Brown Silver-lines, the Common Heath, Bordered White, Black-veined, Grass Wave, and the Yellow Belle and Straw Belle. We have 17 British species.

12. Zerenidæ. Imago with the antennæ of the male thickened, not pectinated; the abdomen of the male long, often spotted with black; the wings broad, entire, white, with grey or black spots. Larva short, rather thick, not humped; feeding exposed on trees and shrubs.

This includes the Large Magpie Moth, the Scorched Carpet, and Clouded Border. We have only 5 British species.

13. Ligidæ. Imago with the antennæ slightly pubescent in both sexes; the abdomen rather slender, the anterior wings oblong, narrow, the posterior wings rounded. Larva elongate, smooth; the head rather thick. We have but 1 species, the common heath-feeding *Pachycnemia hippocastanaria.*

14. HYBERNIDÆ. Imago with the antennæ of the male pubescent or slightly pectinated; the abdomen slender; the wings entire, rather broad; posterior wings covered in repose; the female is apterous, or has only rudimentary wings. Larva moderately long, smooth, cylindrical, not humped.

This family includes the Dotted Border, Mottled Umbre, Spring Usher, and Early moths. We have only 6 British species.

15. LARENTIDÆ. Imago with the antennæ of the male simple or pubescent, or even pectinated, but never plumose; the wings smooth, shining, not angular, rarely dentate, the anterior wings very often marked with numerous wavy transverse lines. Larva more or less elongated, not humped, not attenuated, or only slightly so; very often green, with distinct lines; head generally small and rounded; feeding either exposed or in folded leaves on trees and low plants, sometimes in the seeds of plants.

This extensive family includes the numerous Pug Moths, the Winter Moth, Green Carpet, Common Carpet, Garden Carpet, Silver-Ground Carpet, Purple-Bar Carpet, the Rivulets, Seraphim, and the May and July Highflyers. We have no less than 132 British species.

16. EUBOLIDÆ. Imago with the antennæ of the male simple, pubescent or pectinated, but never plumose; the wings entire, the anterior wings with the tip always pointed, and sometimes rather falcate, generally with distinct lines and an apical streak. Larva elongate, not attenuated, not humped; the head rounded; feeding exposed on low plants.

This family includes the Mallow, the Belle, Chalk

Carpet, Treble Bar, and Streak. We have only 11 British species.

17. SIONIDÆ. Imago with the antennæ of the male simple; the abdomen very slender; wings entire, unicolorous, erect in repose; the anterior wings rather blunt at the tip. Larva slender, velvety, without lines; feeding on low plants.

We have only 1 species, the Chimney Sweeper.

In the PYRALIDINA we have 16 families represented in this country.

1. HYPENIDÆ. Imago with the antennæ of the male ciliated or pubescent, rarely simple; palpi rather long, ascending; the anterior legs with no tuft of hairs; the wings broad and slight; the anterior wings often with tufts of raised scales; the posterior wings generally ample and without markings. Larva elongate, cylindrical, with 14 legs, the first ventral pair often ill-devevoped; feeding exposed.

This family includes the Snout Moths and the allied genera. We have only 7 British species.

2. HERMINIDÆ. Imago with the antennæ of the male pubescent, or pectinated; palpi rather long, ascending; anterior legs frequently with a tuft of hair; anterior wings rather thick, with no tufts of raised scales; posterior wings with feeble markings. Larva short and thick, with 16 legs; feeding more or less concealed.

This includes the Fan-foot Moths. We have only 7 British species.

3. ODONTIDÆ. Imago with the antennæ of the male short, pubescent; palpi slender, short, projecting; the wings thick; the anterior wings oblong, with a projecting tuft of scales on the inner margin. Larva short, thick, attenuated at each end; feeding in stems.

We have only 1 British species, *Odontia dentalis.*

4. PYRALIDÆ. Imago with the antennæ of the male pubescent or ciliated; the wings entire, shining, with long fringes. Larva shining, wrinkled, vermiform.

This family includes the Gold Fringe, Meal Moth, and Tabby Moths. We have only 5 British species.

5. CLEDEOBIDÆ. Imago with the antennæ of the male pectinated; palpi long, slightly arched, porrected; the body slender, much longer than the posterior wings; the anterior wings long and narrow, with the tip rounded. We have but 1 British species, *Cledeobia angustalis.*

6. ENNYCHIDÆ. Imago of small size, with the antennæ of the male simple or pubescent; the abdomen slender, generally with pale belts; the wings entire, silky, the anterior wings more or less pointed at the tip; the posterior wings often with the same or similar markings as the anterior pair; flight mostly diurnal. Larva short, thick, fusiform; feeding between united leaves.

This family includes the Purple and Gold, Crimson and Gold, Silver-Barred Sable, and White Spot. We have only 8 British species.

7. ASOPIDÆ. Imago of small size with the antennæ of the male pubescent; palpi short; the anterior wings oblong, rather pointed at the tip; flight diurnal.

We have only 2 British species, *Agrotera nemoralis* and *Endotricha flammealis.*

8. STENIADÆ. Imago with the antennæ of the male pubescent, or slightly ciliated; palpi rather long, porrected; the abdomen very long and slender; the anterior wings narrow, lanceolate; not transparent or iridescent.

We have only 4 British species, including the Long-legged Pearl and *Diasemia literalis*.

9. HYDROCAMPIDÆ. Imago with the antennæ of the male simple; palpi rather short, ascending; the abdomen rather long and slender; the wings, entire, smooth, silky, but not transparent. Larva smooth, shining; feeding under water.

This family includes the China Marks and the singular *Acentropus niveus*. We have only 5 British species.

10. BOTYDÆ. Imago with the antennæ of the male simple; palpi porrected; the abdomen rather slender, conical; the wings broad, slender, shining, often iridescent; the anterior wings triangular, with glossy fringes. Larva shining, rather fusiform; feeding between united leaves.

This family includes the Small Magpie Moth, the Mother of Pearl, the Garden Pebble, the Diamond Spot, the White Brindled, and the Dusky Brindled. We have 28 British species.

11. NOLIDÆ. Imago with the antennæ of the male ciliated; palpi rather long, somewhat drooping; the anterior wings with the costal margin rather rounded, with three tufts of raised scales; the posterior wings rounded with no markings; in repose the anterior wings completely cover the posterior wings, forming a triangle. Larva with 14 legs, short, thick, rather hairy.

We have only 5 British species, of the genus *Nola*.

12. CHOREUTIDÆ. Imago with the antennæ simple; palpi rather short; the anterior wings rather oblong; in repose partially covering the posterior wings and slightly erected; flight diurnal. Larva with 16 legs, feeding on leaves in a white web.

This includes the Nettle Tap. We have 4 British species.

13. EUDOREIDÆ. Imago with the antennæ of the male slightly pubescent; the labial palpi porrected, longer than the head, partially covered by the maxillary palpi; the anterior wings moderately broad, not folded in repose, forming an elongate triangle. Larva with 16 legs, dull coloured, with the spots large and horny, feeding on moss and lichens in galleries of silk.

This family consists of the genus *Eudorea*. We have 17 British species.

14. GALLERIDÆ. Imago with the antennæ simple, the basal joint generally with a tuft of scales beneath; the labial palpi short in the male, long, and porrected in the female. Larva with 16 legs; feeding on wax in beehives and in the nests of wild bees.

We have only four British species.

15. PHYCIDÆ. Imago with the antennæ of the male simple, but often with a curve near the base and sometimes with a tuft of scales in this curve; the labial palpi generally of moderate length and ascending, sometimes long and porrected; the anterior wings oblong or elongate, slightly folded in repose. Larva with 16 legs; feeding on the leaves, or in the stems of plants, or in dried animal or vegetable substances, generally spinning silken galleries.

This families comprises the various Knot-horns. We have 35 British species.

16. CRAMBIDÆ. Imago with the antennæ of the male generally simple, sometimes ciliated; the labial palpi long, porrected (forming a long beak in front of the head), partially covered by the maxillary palpi; the anterior wings oblong or lanceolate, generally convo-

luted in repose; posterior wings ample. Larva with 16 legs; feeding amongst moss, or in stems of aquatic plants.

This family includes the Veneers, or Grass Moths. We have 34 British species.

Between the PYRALIDINA and TORTRICINA has been placed a family of small extent, of which the proper position seems to be still unsettled, viz. the CHLOEPHORIDÆ. Imago of moderate or small size, with the antennæ simple; the anterior wings are green, covering the posterior wings in repose. Larva with 16 legs; feeding either exposed, or between united leaves.

This only comprises 3 British species.

In the TORTRICINA we have 9 families represented in this country.

1. TORTRICIDÆ. Imago with the anterior wings broad, rarely twice as long as broad, the costa regularly arched, never folded; of the typical markings of the group the basal patch, central fascia, and costal spot towards the tip are generally distinct, but the ocellated blotch near the anal angle is wanting, or only faintly indicated. Larvæ generally active; feeding in united or rolled-up leaves.

This family includes the Green Tortrix and the various species of *Antithesia*. We have 36 British species.

2. PLICATÆ. Imago with the anterior wings rather broad, but frequently twice as long as broad; on the costa towards the base there is a more or less distinct fold in the males. Larva generally sluggish; feeding between united leaves, or in the stems and seeds of plants.

This family is very numerous, and comprises no less than 59 British species.

3. ANCHYLOPERIDÆ. Imago with the anterior wings comparatively narrow, almost always more than twice as long as broad; the costa is not folded at the base, nor obtusely rounded, the tip is frequently produced forming a small hook. Larva generally feeding between united leaves, sometimes under bark, or in rush-stems.

This family is also rather extensive. We have 38 British species.

4. PERONEIDÆ. Imago with the anterior wings rather broad, the costa abruptly arched towards the base, and slightly indented in the middle; there are usually some tufts of raised scales on the surface of the anterior wings. Larva feeding between united leaves.

This family includes the Buttons and Notch-wing. We have 21 British species.

5. STIGMONOTIDÆ. Imago with the anterior wings of variable length, the costa regularly arched, not obtusely so, towards the base. Larva feeding in rolled leaves, or between united leaves, or under bark, or in the young shoots of trees.

This family is tolerably extensive. We have 46 British species.

6. CARPOCAPSIDÆ. Imago with the anterior wings moderately broad; the costa not abruptly arched at the base; the ocellated blotch near the anal angle generally large and distinct, and not unfrequently edged with scales of metallic lustre. Larva feeding in fruits or on seeds, or more rarely in the roots and shoots of plants.

This family includes *Grapholita Ulicetana* and *Carpocapsa Pomonella*. We have 19 British species.

7. CNEPHASIDÆ. Imago with the anterior wings

sometimes rather elongate; the costa nearly straight or slightly arched, the hind margin never concave; the ocellated blotch is wanting. In the most typical species of this family, three nearly equidistant fasciæ are formed by the outer edge of the basal patch, the central fascia, and the prolonged subapical costal spot.

This family is of small extent. We have only 13 British species, but some of these are exceedingly numerous in individuals, and in a few the larvæ seem perfectly omnivorous, occurring on all sorts of plants.

8. SERICORIDÆ. Imago with the anterior wings rather broad; the costa generally much rounded, the tip sometimes pointed, the ocellated blotch not represented. In the most typical species, the central fascia is broad, and its inner edge nearly straight. Larva feeding between united leaves, or in roots.

This family is of moderate extent. It comprises 22 British species.

9. LOZOPERIDÆ. Imago with the anterior wings of variable length; the costa generally regularly arched, the hind margin often oblique; the ocelloid blotch not represented (excepting in the solitary instance of the beautiful *Calosetia nigromaculana*). In many of the typical species the ground-colour of the anterior wings is some shade of yellow, and the central fascia, starting from the inner margin, is parallel to the hind margin. Larva generally feeding on seeds.

This family is extensive, and comprises many beautiful species. We have no less than 45 British species.

Between the TORTRICINA and the TINEINA has been placed the family TORTRICODIDÆ, (which consists of only a single species, *Tortricodes hyemana*). Imago with the anterior wings more than twice as long as wide; the costa arched at the base in the female; but in the male nearly straight, the tip rather pointed; palpi rather shorter than the head, with slender terminal joint.

Of the TINEINA we have 15 families represented in this country.

1. EXAPATIDÆ. Imago with the wings of the male ample, those of the female generally extremely abbreviated and pointed; the antennæ rather thick, pubescent, or densely ciliated; the labial palpi of variable length; the maxillary palpi undeveloped. Larva with 16 legs, the third pair often club-shaped; feeding between united leaves.

This is a family of small extent. We have only 6 British species.

2. TINEIDÆ. Imago with the head rough; the labial palpi short and thick, often bristly; the maxillary palpi often extremely developed; the antennæ very variable, in some genera very long. Larva with 16 legs; residing in a portable case, or feeding in fungi or decayed wood, etc.

This extensive family includes the various Clothes Moths, and the Long-horned Moths. We have 69 British species.

3. MICROPTERYGIDÆ. Imago with the head rough; the labial palpi short, cylindrical, hairy; the maxillary palpi six-jointed, folded; the antennæ shorter than the anterior wings; the wings rather transparent. Larva entirely apodal; mining large flat blotches in leaves; ejecting its excrement in short thread-like pieces.

This family, which only consists of the single genus *Micropteryx*, comprises 12 British species.

4. HYPONOMEUTIDÆ. Imago with the head rough, or smooth; the labial palpi of moderate length; no

maxillary palpi; the anterior wings elongate. Larva frequently gregarious, living in a common tent; sometimes solitary in a web on the surface of leaves.

This family includes the Small Ermine Moths. We have 18 British species.

5. PLUTELLIDÆ. Imago with the head rough; the labial palpi with the second joint furnished beneath with a projecting tuft of scales; the antennæ porrected in repose; the anterior wings generally elongate, sometimes with the tip pointed. Larva fusiform; very active; not living in a case.

This family is of moderate extent. We have only 18 British species.

6. GELECHIDÆ. Imago with the head smooth; the labial palpi recurved, long, or very long, sometimes with the second joint prolonged as a tuft; the anterior wings oblong, or more frequently elongate; the posterior wings rather broad, trapezoidal, or ovate, generally indented below the apex. Larvæ with 16 legs; of very various habits.

This extensive family comprises more than a fourth of the entire group of *Tineina*. We have 173 British species.

7. ŒCOPHORIDÆ. Imago with the head smooth, obtuse, and sometimes retracted; the labial palpi smooth, reflexed, often short; the anterior wings elongate, rarely oblong; the posterior wings lanceolate or elongate, not indented. Larva with 16 legs; feeding in decayed wood, or on leaves of plants.

This family is comparatively of small extent. We have only 32 British species.

8. GLYPHIPTERYGIDÆ. Imago with the head generally smooth; the labial palpi variable; the maxillary

palpi very short, rarely perceptible; the anterior wings oblong or elongate; the posterior wings ovate or lanceolate. Flight diurnal. Larva with 16 legs, or apodal; generally mining in leaves.

This family comprises some very small species (in the genera *Antispila* and *Tinagma*). We have 23 British species.

9. ARGYRESTHIDÆ. Imago with the head rough, the face smooth; the labial palpi rather short, with the terminal joint blunt or slightly pointed; no maxillary palpi; the anterior wings elongate; the posterior wings lanceolate. In repose the insect generally has its head downwards. Larva with 16 legs; in leaves, shoots, or fruits of plants.

This family is not an extensive one. We have 28 British species.

10. GRACILARIIDÆ. Imago with the head rough or smooth, and the antennæ as long as the anterior wings; the labial palpi slender, with the terminal joint pointed; the maxillary palpi rather long and slender; the anterior wings elongate; the posterior wings lanceolate. The insect reposes with the head much raised. Larva with 14 legs; either mining in leaves, or rolling up leaves.

This family, aptly named from the graceful appearance of the insects, is not numerous. We have 28 British species.

11. COLEOPHORIDÆ. Imago with the head smooth; the antennæ porrected in repose, frequently with a tuft of hair at the basal joint; the labial palpi slender, the terminal joint pointed; no maxillary palpi; the wings elongate, lanceolate. Larva with 16 legs; living in a portable case, and mining into the interior of leaves, or of seeds.

This family, which comprises only two genera, is rich in species. We have no less than 69 British species.

12. ELACHISTIDÆ. Imago with the head generally smooth; the labial palpi slender, filiform, generally recurved and pointed; the anterior wings oblong, or elongate; the posterior wings lanceolate, or linear lanceolate. Larva with 16 legs; mostly mining in leaves, often in leaves of grasses.

This family is of considerable extent, and includes a large number of small species. We have 82 British species.

13. LITHOCOLLETIDÆ. Imago with the head rough; the labial palpi filiform, drooping; the anterior wings elongate; the posterior wings linear lanceolate, with long fringes. Larva with 14 legs; mining in leaves.

This family contains only the single genus *Lithocolletis.* We have 46 British species, many of which are remarkable for their beauty.

14. LYONETIDÆ. Imago with the head generally smooth; the antennæ more than half as long as the anterior wings, with the basal joint expanded into an eye-cap; the labial palpi short, drooping (sometimes wanting); the anterior wings narrow, sometimes with prolonged tip; posterior wings lanceolate, with long cilia. Larva with 16 legs; mostly leaf-miners.

This family comprises several small species, divided amongst five genera. We have 23 British species.

15. NEPTICULIDÆ. Imago with the head rough; the antennæ short and thick, the basal joint with a moderate-sized eye-cap; the labial palpi short, almost porrected; the maxilllary palpi rather long, folded; the anterior wings rather broad, short, and often coarsely scaled; the posterior wings lanceolate. Larva with no

true, anterior, horny legs, but with nine pairs of ill-developed prolegs; mining in the interior of leaves, forming long serpentine galleries or irregular blotches.

This family comprises the smallest known *Lepidopterous* insects,—some of them are exquisitely beautiful. We have no less than 52 British species.

The two remaining groups, PTEROPHORINA and ALUCITINA, not being divided into families, this Chapter is here concluded.

CHAPTER VII.

BRIEF DESCRIPTIVE NOTICES OF MANY OF OUR MOST CONSPICUOUS SPECIES.

It would be beyond the scope of the present volume to attempt to describe *all* our Lepidoptera: that has already been done, by the aid of many abbreviations and with our utmost powers of condensation, in the two volumes of the 'Manual of British Butterflies and Moths;' but even there it extends to 800 pages, and our readers, we imagine, will prefer on the present occasion a more detailed notice of a few species to an attempt to compress by abbreviations, etc., a larger number into our space.

BUTTERFLIES.

Family I. Papilionidæ. Subfamily *Papilionidi.*

PAPILIO MACHAON. THE SWALLOW-TAIL BUTTERFLY.

This beautiful insect is not now generally distributed throughout Britain, and seems confined to the fenny districts in Cambridgeshire, Norfolk, and Huntingdonshire. I have also received reliable information of its occurrence in Sussex, at Pulborough. Formerly, I believe, it occurred in various parts of the country, where it is not now found.

It is our largest native butterfly; the expansion of the wings varying from 3½ to 4 inches. The fore-wings are of a deep straw-colour, with a large black patch at the base, and with the veins black and some black spots towards the costa; a black band runs along the hind margin, enclosing eight straw-coloured spots. The hind-wings are straw-colour, with the inner margin blackish, and with a round brick-red spot at the anal angle; towards the hind margin is a broad bluish-black band; near the middle of the hind margin there is a black prolongation forming a tail (whence the English name of "Swallow-tail").

The very beautiful larva is bright green, each segment bearing two black bands, of which the hinder band is ornamented with six orange spots. It feeds on milk-parsley (*Peucedanum palustre*) and other Umbelliferæ, and may be met with from the end of June to the end of August.

The perfect insect begins to appear at the end of May, and may be found up to August. Those who have once had the pleasure of seeing it on the wing can never forget its elegant appearance.

FAMILY I. PAPILIONIDÆ. Subfamily *Pieridi.*

GONEPTERYX RHAMNI. THE BRIMSTONE BUTTERFLY.

This pretty species is common in the south of England, and generally distributed; in the midland counties it is scarcer, and disappears entirely before we get as far north as Scotland,—the northern limit of its food plant, buckthorn, not extending to the Tweed.

It is easily recognised by the brimstone-coloured wings, each of which has an angular projection.

The expansion of the wings is about 2½ inches. The male has the wings of a bright brimstone colour; in the female the wings are paler, of a whitish brimstone; in both sexes near the centre of each wing is a small orange spot.

The larva is dark green, rather velvety-looking, with a pale line on each side. It may be found in June on the shining dark green leaves of *Rhamnus catharticus* (common buckthorn), or on the paler leaves of *Rhamnus frangula*.

The perfect insect emerges from the pupa at the beginning of August, and it tends to enliven the woodland scenery during many an autumn ramble, now sitting on the purple flowers of the thistle—now on the blue flowers of the devil's-bit scabious. A warm, sunny day in October, we may still see stragglers of this species; after which they retire into out-houses, hollow trees, woods, stacks, etc., where they remain dormant during the winter; but the first warm, sunny days in February and March entice it from its winter retreats, and when we see these butterflies threading their way along some sheltered lane they seem to us the happy harbingers of spring.

FAMILY I. PAPILIONIDÆ. Subfamily *Pieridi.*

COLIAS EDUSA. THE CLOUDED YELLOW BUTTERFLY.

(Plate I., Fig. 1.)

A beautiful insect, common in some years in the south of England, but comparatively seldom occurring in the midland counties. In exceptional seasons, it has occurred in Yorkshire and Westmoreland.

By the deep, rich, yellow colour of the wings it may be at once recognised,—no other of our native butterflies coming at all near it in that respect.

The expansion of the wings is from 2 to 2¼ inches. Both sexes have the fore-wings of a deep rich yellow, with a central black spot, and a broad black band along the hind margin; this black band is simply veined with yellow in the male (represented on the Plate), but in the female it contains several yellow spots. The hind wings are much clouded with grey, with a large central orange-yellow spot.

The larva is of a dark green with a white stripe spotted with yellow on each side. It feeds in June and July on clover and lucerne, and reposes on the upper surface of the leaf along the midrib.

The perfect insect makes its appearance towards the end of August and flies swiftly in meadows and lanes, and may frequently be observed on railway banks. It continues to come out throughout September, and in fine seasons it may be met with during the first half of October. In some seasons it is very scarce, but in others it occurs in unusual plenty.

There is a pale variety of the female, which was at first described as a distinct species. In it the ground-colour of the wings, instead of being the deep, rich yellow, is of a dull greenish-yellow.

The Pale Clouded Yellow (*Colias Hyale*) is an allied species, less frequent in occurrence and less brilliant in appearance. It was extremely plentiful in the year 1842. The larva of *C. Hyale* has been noticed by Mr. Tugwell in the 'Entomologist's Weekly Intelligencer' (vol. iii. p. 11).

FAMILY I. PAPILIONIDÆ. Subfamily *Pieridi.*

APORIA CRATÆGI. THE BLACK-VEINED WHITE BUTTERFLY.

A peculiar-looking insect, common where it occurs, but by no means generally distributed. It is met with at Herne Bay, at Lyndhurst in the New Forest, and at Lewes in Sussex.

The expansion of the wings is about 2½ inches. The wings are all white, rather transparent, with strongly-marked black veins, and along the hind margin of the fore-wings is a dusky cloud.

The larva is black on the back, with two reddish-yellow stripes; the sides and belly are ashy-grey; it is covered with whitish hairs. It feeds in May on hawthorn principally, but is also found on apple, pear, sloe, and plum.

The perfect insect makes its appearance in June.

FAMILY I. PAPILIONIDÆ. Subfamily *Pieridi.*

PIERIS BRASSICÆ. THE LARGE WHITE BUTTERFLY.

A most abundant species throughout the country.

The expansion of the wings is about 2½ inches. The fore-wings are white, with the tip black and with the base and costa blackish. The male has no black spots on the surface of the fore-wings, but the female has two round black spots and a black dash on the inner margin. In both sexes the hind-wings are white, with a black spot on the costa.

The larva is rather handsome, but it is such a pest in kitchen-gardens that we are apt to overlook its beauty.

It is yellowish, spotted with black, and has a row of raised black spots on each side of the back. (See woodcut at p. 7, Fig. 1). It feeds in June and September on cabbages, sometimes nearly stripping them of their leaves; it is also partial to the various species of *Tropæolum.* Few larvæ are more subject to the attacks of parasitic insects than this, and in autumn we frequently see one of these larvæ dead or dying on a wall or paling, resting on a number of small yellow cocoons, which are the cocoons spun by the parasitic larvæ which have fed within its body.

The perfect insect may be met with almost constantly from the end of April to the middle of August, though at the end of June and beginning of July there is generally a slight intermission between the two broods.

The Small White Butterfly (*Pieris rapæ*), and the Green Veined White (*Pieris napi*), are equally plentiful throughout the country. Both are readily distinguished from the Large White Butterfly by their smaller size, and the Green-veined White is readily recognised by the greenish veins on the underside of the hind wings.

One of our rarest native butterflies is the Bath White (*Pieris Daplidice*). It is sometimes found in August in the south of England.

FAMILY I. PAPILIONIDÆ. Subfamily *Pieridi.*

ANTHOCHARIS CARDAMINES. THE ORANGE-TIP BUTTERFLY.

(Plate I., Fig. 2.)

This lovely insect seems generally distributed and common throughout the country.

The expansion of the wings is about 1¾ inches. The fore-wings are white, with the tip blackish, and a small spot near the centre. The male has, in addition, the apical half of the wing of a deep orange. Hence the male is one of our gayest butterflies, whilst the female, to an unpractised eye, might pass for an ordinary White; but in both sexes the underside of the hind wings is white, prettily chequered with yellowish-green. (The figure on Plate I. represents the underside of the male.)

The larva is green, with a whitish stripe on each side. It feeds in July on *Turritis glabra, Cardamine impatiens*, and other *Cruciferæ*.

The perfect insect makes its appearance in forward seasons at the end of April, and may be met with throughout May enlivening by its presence many a grassy lane, then in its first burst of spring verdure, when our native songsters are causing the country to resound with their pleasant warbles.

The Wood White Butterfly (*Leucophasia sinapis*) is rather a local species, frequenting woods. It occurs in various parts of the country. Its flight is very weak. It may be known by its small size, by the spotless white wings, the tip of the fore-wings being only clouded with blackish.

FAMILY II. NYMPHALIDÆ. Subfamily *Satyridi.*

ARGE GALATHEA. THE MARBLED WHITE BUTTERFLY.

(Plate I., Fig. 3.)

This elegant insect is found in many of the southern and midland counties, but is extremely local, being very often confined to one corner of a meadow.

The expansion of the wings is about 2 inches. All the wings are creamy-white, marbled and veined with black. On the underside of the fore-wings, near the tip, is a white-centred black spot in a white ring, and on the underside of the hind-wings are six similar spots near the hind margin.

The larva is green, with two yellowish lines on each side; the head and the bifid tail are reddish. It feeds in May and June on Timothy-grass (*Phleum pratense*).

The perfect insect makes its appearance about the middle of July, and may be found till the middle of August; where it occurs it is generally in extreme profusion, hundreds being congregated together within a very small space.

FAMILY II. NYMPHALIDÆ. Subfamily *Satyridi.*

LASIOMMATA ÆGERIA. THE SPECKLED WOOD BUTTERFLY.

This quiet-looking species is common throughout the country.

The expansion of the wings is from 1¾ to 2 inches. The fore-wings are brown, with yellowish spots towards the hind margin, in one of which, near the tip, is a white-centred black spot. The hind wings are brown, with four yellowish spots towards the hind margin, the three lowermost of which each contain a white-centred black spot.

The larva is green, with about eight rows of white irrorations; the dorsal vessel is darker green; the spiracles are ochreous. It feeds in June and October on couch-grass (*Triticum repens*), and other grasses.

The perfect insect appears at the end of April and beginning of May, and frequents woods and shady lanes, flying amongst the lower branches of trees, on the leaves of which it frequently settles. The second brood of the perfect insect may be noticed in July and August.

FAMILY II. NYMPHALIDÆ. Subfamily *Satyridi*.

LASIOMMATA MEGÆRA. THE WALL BUTTERFLY.

This rather bright-looking butterfly is common throughout the country.

The expansion of the wings is from 1¾ to 2 inches. The fore-wings are yellowish-brown or fulvous, with rich dark brown markings; near the tip is a white-centred black spot. The hind-wings are also fulvous, with brown markings, with three white-centred black spots near the hind margin, and a fourth less distinct near the anal angle.

The larva is green, with three very faint pale dorsal lines, and on each side is a more distinct pale line; it feeds in April and July on various grasses.

The perfect insect appears in May and again in August and September; it frequents roadsides and lanes, frequently settling on the ground or on walls.

The larger and more conspicuous Grayling Butterfly (*Hipparchia Semele*) frequents dry rocky places in July and August; it flies rapidly, and, being rather shy, its beauties are seldom displayed to the casual observer.

FAMILY II. NYMPHALIDÆ. Subfamily *Satyridi*.

HIPPARCHIA JANIRA. THE MEADOW BROWN BUTTERFLY.

This rather dull-looking, slow flying species is abundant everywhere.

The expansion of the wings is from 1¾ to nearly 2 inches. The fore-wings are dull brown; in the male there is a small fulvous ring near the tip, containing a white-centred black spot; in the female, instead of simply a small fulvous ring, there is a large central fulvous patch. The hind-wings are dull brown, with no markings.

The larva is pale apple-green, with a white stripe on each side; it feeds in May on Smooth-stalked Meadow-grass (*Poa pratensis*) and other grasses.

The perfect insect makes its appearance towards the end of June, and continues out till August; it is very plentiful in hayfields and meadows.

Somewhat similar to the Meadow Brown Butterfly, but rather smaller, and with a large central fulvous patch on each wing, is *Hipparchia Tithonus*, which is common in woods and lanes, in July and August, in the southern and midland counties of England. We frequently see it sitting on bramble blossoms. A male of this species is shown on Plate I. Fig. 4.

Another allied species frequenting woods and thickets in July is the Ringlet Butterfly (*Hipparchia hyperanthus*); this has the wings of a sooty-brown, with no fulvous patches, but with several white-centred black spots, each in a pale tawny ring; of these spots there are from one to three on the upper side of the forewing, two on the hind-wing; on the under side of the hind-wing there are frequently five of these spots.

FAMILY II. NYMPHALIDÆ. Subfamily *Satyridi*.

EREBIA BLANDINA. THE SCOTCH ARGUS.

This is rather a mountain species, and is only found in the north of England and Scotland. It occurs at Wharfedale, in Yorkshire, near Kendal, Colne, and at Castle Eden Dene.

The expansion of the wings is very nearly 2 inches; the fore-wings are of a rich dark brown, with a reddish patch beyond the middle, in which are two white-centred black spots, close together, near the tip, and a third lies towards the anal angle. The hind-wings are of a rich dark brown, with a reddish patch beyond the middle, which contains three white-centred black spots, and above them a smaller black spot.

The perfect insect makes its appearance about the middle of July, and may be met with till the middle of August; it frequents grassy places on hill-sides.

The smaller allied species, *Erebia Cassiope*, is more truly a mountain insect, seldom occurring but at a considerable elevation, where it frequents marshy hollows on the mountain-sides. Mr. Bibbs has recorded in the 'Intelligencer,' vol. vii. p. 132, its occurrence in July, 1847, on the roadside skirting Loch Vennachar, leading from Callander to the Trossachs. It occurs on many of the mountains of the Cumberland Lake district; in Scotland has been observed at Rannoch, in Perthshire, and in various other localities. Mr. E. C. Buxton once fell in with it in extreme profusion.

FAMILY II. NYMPHALIDÆ. Subfamily *Satyridi*.

CŒNONYMPHA PAMPHILUS. THE SMALL HEATH BUTTERFLY.

This pretty little species is generally distributed, and very plentiful throughout the country.

The expansion of the wings is little more than 1 inch, The fore-wings are tawny, shading into brown at the margins, with a more or less distinct blackish spot near the tip. The hind-wings are tawny, slightly darker at the hind margin. On the underside of the fore-wings we see one white-centred black spot near the tip; the underside of the hind-wings is ashy-grey, towards the base brownish, with a central whitish band, and then a narrow brown band, in which are from three to six white dots.

The larva is of a delicate apple-green, with three darker green stripes, bordered with whitish; the head and underside are yellowish-green; the anal points are reddish; it feeds from May to August on various grasses.

The perfect insect appears in June, and may be met with in September; it occurs in hayfields and meadows, and grassy hill-sides.

Closely allied to the Small Heath Butterfly, but larger, and with several distinct white-centred black spots on the underside of the wings,—namely, from one to four on the fore-wings and from six to seven on the hind-wings,—is the Marsh Ringlet (*Cœnonympha Davus*), which occurs in June and July on moors and mosses in the north, and on hill-tops in Scotland; it also occurs in the west of Ireland.

FAMILY II. NYMPHALIDÆ. Subfamily *Nymphalidi.*

LIMENITIS SIBILLA. THE WHITE ADMIRAL BUTTERFLY.

This graceful insect is confined to woods in the south of England; amongst the recorded localities may be mentioned Epping and Colchester in Essex, Tenterden in Kent, Black Park in Buckinghamshire, Andover, Lyndhurst, and Winchester in Hampshire, the Isle of Wight, and the neighbourhood of Worcester.

The expansion of the wings is from 2 to nearly 2½ inches. The fore-wings are blackish-brown, with a central white band interrupted in the middle, beyond this are two small white spots near the tip, and one near the middle of the hind margin, and a less conspicuous whitish spot lies between the central band and the base of the wing. The hind-wings are blackish-brown with a central whitish band, forming a continuation of that on the fore-wings. The underside of the hind wings is of a delicate silvery-blue at the base and inner margin.

The spiny larva is pale green, with a lateral white stripe on the seven last segments; on the second, third, fifth, eleventh, and twelfth segments are long, ferruginous, branched spines, and there are shorter spines on the sixth to tenth segments; on each side are two rows of short spines, beneath it is green; it feeds on honeysuckle in April and May.

The perfect insect appears at the end of June and in July, frequenting woods. Its flight is considered to be the most graceful of that of any of our native butterflies.

FAMILY II. NYMPHALIDÆ. Subfamily *Nymphalidi.*

APATURA IRIS. THE PURPLE EMPEROR BUTTERFLY.

This magnificent insect is confined to woods in the south of England, but is widely distributed in Kent, Sussex, Essex, Suffolk, Huntingdonshire, etc. I believe it has not been noticed north of Lincolnshire.

The expansion of the wings is from 2½ to 3½ inches.

The brilliant bluish-purple gloss is peculiar to the male, and is only visible when we look at the wings in a particular direction; a specimen which appears at one moment of a most brilliant purplish-blue will the next instant seem of a dull blackish-brown; the forewings have three small white spots near the tip, five others placed nearly in a curve from the middle of the costa to near the anal angle, and a white band in the centre halfway across the wing; in the hind wings the central white band is continued across nearly to the anal angle, where the colour of the wing becomes fulvous; between the white band and the hind margin, near the anal angle, is a black spot in a fulvous ring.

The curious-looking larva is pale green, with oblique yellow lines, and a yellow stripe on each side; the head bears two green tentacle-like horns, whence the larva, which is very stout in the middle and much attenuated towards the tail, has been not inaptly compared to a green slug; it feeds in May and at the beginning of June on sallows and poplars.

The perfect insect appears in July, and soars on the tops of oak-trees. Occasionally it descends lower down so as to come within the reach of the collector, but unless we resort to stratagem it is not easy to obtain a series of this handsome insect. The dead stoats, weasels, etc. nailed by gamekeepers to the sides of barns, are found to be a favourite repast with the Purple Emperor, and when these happen to be placed in a wood frequented by *Apatura Iris*, a goodly number will descend to regale on these delicacies. In 1857, one collector captured thirty-seven specimens in two days, by this means.

FAMILY II. NYMPHALIDÆ. Subfamily *Vanessidi.*

CYNTHIA CARDUI. THE PAINTED LADY BUTTERFLY.

This pretty species occurs throughout the country, but is very irregular in its appearance: some years it is plentiful, some years it is hardly noticed at all.

The expansion of the wings is 2¼ inches. The fore-wings are pale orange-red, spotted and mottled with black; the base of the wing is blackish; in the black tip are five white spots. The hind wings are pale orange-red, spotted and mottled with black, the base is dusky blackish.

The spiny larva is brown, with two dorsal and two lateral yellow lines; on the third, fourth, and twelfth segments there are four spines; on the fifth to eleventh segments seven spines, and on the thirteenth two spines; it feeds solitarily in rolled thistle leaves in June and July.

The perfect insect appears at the end of July, and is found throughout August and September; after hybernating, it is again seen on the wing on bright warm days in March and April.

FAMILY II. NYMPHALIDÆ. Subfamily *Vanessidi.*

VANESSA ATALANTA. THE RED ADMIRAL BUTTERFLY.

(Plate II., Fig. 1.)

This handsome species is common throughout the country.

The expansion of the wings is from 2¼ to 2¾ inches The fore-wings are black, with a broad deep red centra band, and with one large and five small white spots near the tip. The hind-wings are black, with a broad deep red band at the hind margin, in which are four black spots; at the anal angle is a large blue-and-black spot.

The spiny larva is yellowish-grey, with a pale yellow lateral line; the third and fourth segments have four spines; the fifth to twelfth have seven spines; between the second and third row of spines is a row of black V-shaped markings. It feeds solitarily in rolled leaves of the stinging nettle in June and July.

The perfect insect makes its appearance in August, and is constantly to be seen on sunny warm days in September and the first half of October, feasting on fallen plums, pears, etc., and revelling in the blossoms of China asters, dahlias, thistles, brambles, and ivy, etc.; it lives through the winter, but the hybernated specimens are seldom seen till May is well advanced, and then they never appear in such numbers as the allied hybernating species.

FAMILY II. NYMPHALIDÆ. Subfamily *Vanessidi.*

VANESSA IO. THE PEACOCK BUTTERFLY.

This beautiful butterfly is common throughout England, but becomes scarce when we get into Scotland.

The expansion of the wings is from 2½ to 2¾ lines. The fore-wings are of a dull deep red, with two black marks from the costa; beyond the second is a large eye-like spot of many colours, namely, yellow, black, red, bluish-lilac, rosy, and white; the hind margin is brown. The hind-wings are dull deep red, with a large black eye-like spot, shaded with bluish-lilac, placed in a pale brown ring towards the outer angle.

The spiny larva is black with numerous white dots; the third and fourth segments have two spines, the fifth has four spines, the sixth to twelfth have six spines, and the thirteenth two short spines; it is gregarious, occurring on the tops of stinging nettles in June and July.

The perfect insect appears in August, and frequents gardens and lanes during that and the following month; its brilliant colours, as we see it with its wings expanded, contrasting curiously with its sombre appearance when the wings are erect. It lives through the winter, and is frequently seen on bright sunny warm days disporting itself on the wing, more especially in March and April.

The splendid Camberwell Beauty (*Vanessa Antiopa*) is rarely met with in this country, and few have had the pleasure of seeing a living British specimen; it is readily known by the broad whitish hind margins to the purplish chocolate wings. It appears in the perfect state in August and September, and hybernated specimens may occur in April and May.

FAMILY II. NYMPHALIDÆ. Subfamily *Vanessidi.*

VANESSA POLYCHLOROS. THE LARGE TORTOISE-SHELL BUTTERFLY.

This handsome species occurs throughout the south of England, but does not seem to be generally common. Of late years it appears to have become much scarcer than formerly.

The expansion of the wings is about 2½ inches. The fore-wings are deep fulvous, with black spots, namely, three large black spots on the costa, two smaller in the centre, and two near the inner margin, a dark border runs along the hind margin. The hind-wings are deep fulvous with a large black spot on the costa, and with blue crescent-shaped spots in the dark border along the hind margin.

The spiny larva is black speckled with grey, with tawny-grey broad dorsal stripe, intersected by a black line down the centre, and with a tawny stripe above the legs; it is gregarious, feeding on elm-trees in June and July.

The perfect insect makes its appearance towards the end of July, and continues to occur throughout August, but at that season of the year it is seldom noticed on the wing; it lives through the winter, coming out from its retreats on hot sunny days, and in March, April, and May it is seen much more frequently than in July and August.

FAMILY II. NYMPHALIDÆ. Subfamily *Vanessidi.*

VANESSA URTICÆ. THE SMALL TORTOISE-SHELL BUTTERFLY.

One of our commonest butterflies, occurring throughout the country.

The expansion of the wings is from 2 to 2¼ inches. It closely resembles the preceding, but is smaller, the ground-colour is more fiery, and on the costa, near the tip, is a white spot. The fore-wings are reddish-orange, with three large black spots on the costa (the third followed by a white spot), two smaller black spots near the centre, and one large one on the inner margin; a dark border, containing crescentic blue spots, runs along the hind margin. The hind-wings are black at the base, then reddish-orange with a blue-spotted, dark border along the hind margin.

The spiny larva is yellowish-grey, with a black dorsal line and a broad brownish lateral stripe, below which there is a yellowish line; the third and fourth segments have four spines, the fifth to twelfth have seven spines; it feeds gregariously on the tops of stinging nettles from May to August. In some years there appears to be a constant succession of the larvæ.

The perfect insect appears in June, and is then constantly to be seen till the approach of winter; it lives through the winter, appearing in December and January if the weather be sunny and warm enough; in March, April, and May it becomes of more frequent occurrence.

With the exception of the common white butterflies, this is the only butterfly that penetrates into the heart of London and other large towns. I have frequently seen it in the City.

FAMILY II. NYMPHALIDÆ. Subfamily *Vanessidi.*

GRAPTA C-ALBUM. THE COMMA BUTTERFLY.

Formerly this was common in the Metropolitan district, but now it is very rarely seen there. It still occurs, however, at Dorchester, Bristol, Gloucester, Worcester, Leominster, Burton-on-Trent, Wavendon near Newport-Pagnel, Peterborough, York, and Carlisle; in some of these localities it is extremely plentiful.

The expansion of the wings, which have a remarkably jagged outline, is from about 2 to 2¼ inches. All the wings are deep fulvous, with narrow dark brown margins, and with several black and brown spots of various sizes; the undersides are dusky-brown, but in the centre of the underside of the hind-wing is a white mark like the letter C.

The spiny larva is tawny mingled with black, and with a broad whitish patch on the back of the seventh to twelfth segments; the head and second segment are black; the head with two short ear-like projections. It feeds in June and July on elm, currant, hop, etc.

The perfect insect appears in July and August; it lives through the winter, and is again seen on the wing in April and May.

FAMILY II. NYMPHALIDÆ. Subfamily *Argynnidi*.

ARGYNNIS PAPHIA. THE SILVER-WASHED FRITILLARY.

This handsome species is very common throughout the south of England, in woods; in the north it occurs near Huddersfield, York, Scarborough, and Darlington.

The expansion of the wings is from 2½ to nearly 3 inches. All the wings are bright fulvous, with black stripes and spots. The hind-wings on the underside are greenish, with the hind margin silvery and with three silvery bands.

The female has generally a greenish tinge on the upper side, and varieties occur in both sexes in which the brilliant fulvous colour is quite suffused.

I know of few more dazzling sights than half-a-dozen specimens of this insect, fresh from the chrysalis, feasting on the flowers of a thistle.

The spiny larva is black, with two slender sulphur-coloured lines down the back, and several ochreous lateral streaks; two spines of unusual length project over the head; it feeds on the dog-violet (*Viola canina*) at the end of May and beginning of June.

The perfect insect appears in July, and continues till

August is well advanced, indeed wasted stragglers may be met with in September; it is fond of settling on bramble blossoms.

FAMILY II. NYMPHALIDÆ. Subfamily *Argynnidi*.

ARGYNNIS AGLAIA. THE DARK GREEN FRITILLARY.

Not so plentiful as the preceding, but occurring pretty generally throughout the country, and extending its range into Scotland, where I have often met with it in the glens of Argyleshire.

The expansion of the wings is from 2¼ to 2½ inches. All the wings are fulvous, spotted with black. On the underside of the fore-wings are some marginal spots towards the tip (which are wanting in the closely allied High Brown Fritillary, *A. Adippe*); the underside of the hind-wings is greenish, with about twenty distinct silvery spots.

The spiny larva is black, with two pale yellow dorsal lines, and with reddish lateral spots on the fifth to twelfth segments; the projecting spines at the head are shorter than in the larva of *A. Paphia;* it feeds in May and June on the dog-violet.

The perfect insect makes its appearance in July, frequenting woods and heaths,—many a sylvan glade being then the resort of this beautiful insect.

The High Brown Fritillary (*Argynnis Adippe*) is so closely allied to the Dark Green Fritillary, that we only distinguish them by the markings on the underside; in *A. Adippe* the silver on the marginal spots of the hind-wings is less distinct, and between the marginal spots and the central row of silver spots there is a row of small dull red spots, each with a bluish centre. Its times of appearance and habits are quite similar to those of *A. Aglaia*, and, like it, it ranges throughout the country; in some localities it is the commoner of the two.

Family II. Nymphalidæ. Subfamily *Argynnidi.*

ARGYNNIS LATHONIA. THE QUEEN OF SPAIN FRITILLARY.

One of the most beautiful and rarest of our Butterflies; from time to time it has occurred in various localities in the south of England, but never in any numbers. It differs from both the preceding species in its smaller size, and the concave hind margin of the anterior wings, but the most distinctive character is found in the underside of the hind-wings; here we see a marginal row of seven silvery spots, and near it a row of seven dark brown spots, each with a central silvery dot; towards the base we cannot fail to be struck with the seven large and brilliant silvery spots; by these we may recognize *A. Lathonia* instantly. In this country, I believe, it has most frequently been captured in August and September.

Family II. Nymphalidæ. Subfamily *Argynnidi.*

ARGYNNIS SELENE. THE SMALL PEARL-BORDERED FRITILLARY.

Common throughout England, frequenting woods and thickets in June; it occurs also in many parts of Scotland in June and July.

The expansion of the wings is from 1½ to 1⅝ inches. On the upper side all the wings are fulvous, spotted with black; on the underside of the hind-wings we see several large silvery spots. In the closely allied *Argynnis Euphrosyne*, which frequents the same localities, and appears about a week earlier in the season, there is *only one* silvery spot on the underside of the hind wings.

The spiny larva is black, the spines paler; it feeds on the dog-violet in September.

The perfect insect appears the first week in June, and keeps out for several weeks.

The three species of *Melitæa* (*Cinxia*, *Athalia*, and *Artemis*) have all very similar upper sides, deep fulvous, tessellated with brownish-black (*Artemis* inclines more to a reddish-fulvous); they are distinguished at a glance from *Argynnis Selene* and *A. Euphrosyne* by the total absence of any silvery spots on the underside of the hind-wings.

Athalia frequents heaths and woods in the south; *Artemis* prefers moist meadows, and occurs as far north as York and Carlisle, and *Cinxia* is almost exclusively confined to the undercliff at Sandown, in the Isle of Wight. All are on the wing in June, the larvæ feeding in April and May. The larvæ of *Athalia* and *Cinxia* feed on the rib-wort plantain (*Plantago lanceolata*); the larva of *Artemis* feeds on scabious, plantain, foxglove, etc.; all are spiny, with seven rows of spines.

FAMILY III. ERYCINIDÆ.

NEMEOBIUS LUCINA. THE BURGUNDY FRITILLARY.

Not uncommon in woods in the south of England.

The expansion of the wings is from 1 to 1¼ inches. From its resemblance to a miniature *Melitæa*, it has received the English name of Fritillary, but it is not in any way related to the species we have last been considering.

All the wings are blackish-brown with tawny spots, those along the hind margin each contain a central black dot. On the underside of the hind-wings are two rows of white spots; one at the base and one near the centre.

The larva, shaped like a woodlouse, is dingy olive, with yellow and orange spots, and with tufts of hair of a reddish-orange; it feeds on primrose and cowslip in June and July.

The perfect insect appears at the end of May and beginning of June.

FAMILY IV. LYCÆNIDÆ.

THECLA BETULÆ. THE BROWN HAIR-STREAK BUTTERFLY.

(Plate II., Fig. 2.)

This pugnacious little butterfly frequents hedgerows and borders of woods in the south of England, but is not common. It appears to be more plentiful in the south-west of Ireland.

The expansion of the wings is about 1½ inches. The fore-wings are of a rich brown, in the male with an indistinct yellowish blotch beyond the middle (in the female this blotch is larger, distinct, and orange); the hind-wings are of a rich brown, with two or three orange spots near the anal angle. On the underside all the wings are of an ashy-fulvous; the hind-wings have two transverse white lines.

The larva, shaped like a woodlouse, is pale green with distinct oblique white lines; it feeds at the end of June and beginning of July on sloe.

The perfect insect makes its appearance in August; it delights to settle on the topmost twig of a hedge, and to battle with every butterfly that comes near it; hence specimens that have been long on the wing get to have a very tattered appearance.

The two allied species, the Dark Hair-streak and Black Hair-streak (*Thecla pruni* and *T. W-album*), have the upper side of the wings darker, no markings on the fore-wings, but a few orange spots at the anal angle of the hind-wings (only one such spot in *T. W-album*); on the underside of the hind-wings is one central, slender, white streak; in *T. pruni* this has a bluish tinge, and is simply waved near the anal angle; in *T. W-album* it is whiter and forms the letter W near the anal angle. *T. pruni* only occurs in a few woods in Huntingdonshire. *T. W-album* is commoner, and occurs at Epping, Peterborough, Bristol, and York.

FAMILY IV. LYCÆNIDÆ.

THECLA QUERCUS. THE PURPLE HAIR-STREAK BUTTERFLY.

This species is common, and generally distributed in the south of England; it also occurs near York, and in the Cumberland Lake district; likewise in Ireland.

The expansion of the wings is from 1¼ to 1½ inches. The wings are of a blackish-brown, tinged with a rich purplish-blue. The female has a large purplish blotch on the upper surface of the fore-wings. The undersides of the wings are ashy grey, with two orange spots near the anal angle of the hind-wings.

The larva, shaped like a woodlouse, is of a reddish-brown colour, with two rows of short, oblique, black stripes on the back. It feeds in June, on the oak.

The perfect insect appears in July, and continues out till August is well advanced. It has a tendency to fly high up the trees, like the Purple Emperor, and may often be observed in considerable numbers, just out of reach. It has been observed to frequent ash trees.

FAMILY IV. LYCÆNIDÆ.

THECLA RUBI. THE GREEN HAIR-STREAK BUTTERFLY.

Abundant throughout the country, frequenting woods and heaths. It is readily distinguished at a glance by the green underside of the wings.

The expansion of the wings is from 1 inch to 1¼. All the wings above are brown and spotless; on the underside they are green, and the hind-wings have a central row of white dots.

The larva is grass-green, with a white dorsal stripe, and on each side a row of whitish spots and a white line above the feet. It feeds in July, on bramble and papilionaceous plants.

The perfect insect appears at the end of May and beginning of June. When flying, from its dingy colour it is difficult to follow with the eye, but directly it settles and erects its wings over the back it shows the green undersides, and is then easily observed.

FAMILY IV. LYCÆNIDÆ.

CHRYSOPHANUS PHLŒAS. THE SMALL COPPER BUTTERFLY.

(Plate II., Fig. 3.)

A very pretty species, common throughout the country, often enlivening by its presence our last autumnal walk.

The expansion of the wings is about 1 inch to 1¼. The fore-wings are bright coppery red, spotted with black, and with the hind margin blackish; the hind-wings are blackish, with a bright coppery red hind margin. The underside of the hind-wings is ashy-brown, with faintly darker spots.

The larva, shaped like a woodlouse, is green, with a reddish dorsal line, and a red stripe on each side. It feeds on sorrel, in May, July, and September.

The perfect insect makes its appearance at the end of May and is to be met with almost constantly up to the middle of October, when, sitting on the flowers of ragwort, scabious, or thistle, occasionally turning round, and now and then starting off to combat with some passing butterfly, nearly twice its size, it cannot fail to attract the attention of any lover of Nature.

An allied but considerably larger species is the Large Copper Butterfly (*Chrysophanus dispar*). It used to be common in the fenny districts of Cambridgeshire and Huntingdonshire, but since the extensive draining operations in that part of the country—more especially since the draining of Whittlesea Mere—the insect has not been observed. Possibly there are still some small fen-districts where the species still occurs. Independently of its larger size, it may be distinguished from the Small Copper Butterfly by the pale blue underside of the hind-wings.

FAMILY IV. LYCÆNIDÆ.

POLYOMMATUS ARGIOLUS. THE AZURE-BLUE BUTTERFLY.

A common species throughout the south, and occurring northwards as far as York and the Cumberland Lake district; in Ireland it is common.

The expansion of the wings is about 1¼ inch. All the wings are of a lilac-blue, the fore-wings being sometimes tinged with blackish towards the hind margin. The underside of the wings is of a pale silvery blue; the fore-wings shewing a marginal row of oblong black spots.

The larva, shaped like a woodlouse, is of a yellowish-green, with a dark green dorsal line. It feeds in June on the flowers of holly and buckthorn, and in October on the flowers of ivy.

The perfect insect makes its appearance in forward seasons at the end of April, more generally in May; and a second brood, less numerous, may be noticed in August. It is said sometimes to frequent currant bushes in gardens, but may be most readily met with amongst holly-bushes in woods.

Closely allied to the preceding, but smaller and with the upper surface of the wings dull-brown, only faintly shot with blue, is the smallest of our native butterflies —the Small Blue (*Polyommatus Alsus*). It occurs principally on chalk and limestone, and is sometimes very abundant. It appears in the perfect state at the end of May and in June.

The expansion of the wings is only from ¾ of an inch to an inch.

Another of our blue butterflies is *Polyommatus Acis,* now of rare occurrence. Like the two preceding species, it has no red spots on the underside of the wings, but there is a distinct row of marginal black spots in white rings on each wing.

FAMILY IV. LYCÆNIDÆ.

POLYOMMATUS ARION. THE LARGE BLUE BUTTERFLY.

Also a local species, occurring in Northamptonshire and Devonshire in July. It is the largest of our blue butterflies, and is immediately known by the black spots in the centre of the upper side of the fore-wings.

Expansion of the wings about 1½ inch. The fore-wings are deep rich blue, spotted with black in the centre, with the hind margin broad and blackish; the hind-wings are deep rich blue, with a broad blackish hind margin.

FAMILY IV. LYCÆNIDÆ.

POLYOMMATUS ADONIS. THE CLIFDEN BLUE BUTTERFLY.

(Plate II., Fig. 4.)

This beautiful insect is not uncommon in chalky and limestone localities in the south of England.

The expansion of the wings is from 1¼ to 1½ inch. The wings of the male are above of a bright smalt blue, with the fringes whitish, chequered with dark fuscous; the wings of the female are brownish-slate colour. On the underside the fore-wings have two black spots before the central black spot, and the hind-wings have a row of red spots towards the hind margin.

The larva feeds on various papilionaceous plants in May and June.

The perfect insect is on the wing at the end of July and during August.

In company with it we frequently find the soberer looking Chalk-hill Blue Butterfly (*Polyommatus Corydon*) of which the male has the upper side of the wings of a pale silvery blue; those of the female are light brown, and it is by no means easy to separate the female of *Corydon* from the female of *P. Adonis.*

FAMILY IV. LYCÆNIDÆ.

POLYOMMATUS ALEXIS. THE COMMON BLUE BUTTERFLY.

Throughout the country, this pretty little insect enlivens every meadow, every green lane, and many a hill-side, from May to September.

The expansion of the wings is about 1¼ inch. In the male all the wings are of a lilac-blue, with the fringes white, unchequered. In the female the wings are lilac-blue tinged with brown, and along the hind margin is a row of indistinct orange spots.

On the underside of the fore-wings there are two small black spots before the central black spot, and the hind-wings have a row of red spots towards the hind margin.

The larva (shaped like a woodlouse) is rather dark green, with short brown hairs, which give it a velvety appearance. The dorsal line is darker, and on the sides there are short oblique blackish streaks; the spiracles are whitish; it feeds on clover and bird's-foot trefoil in April, June, and August.

The perfect insect may sometimes be noticed asleep in the evening on the blossoms of rushes.

Allied to the preceding, but with the fore-wings of the male of a purplish-blue, is the Silver-studded Blue (*Polyommatus Ægon*). It frequents sandy heaths and chalky downs, and is generally very plentiful where it occurs. It may be always distinguished with certainty from the Common Blue by the two following characters: —on the underside of the fore-wings there are no spots between the central spot and the base of the wing, in the Common Blue there are two black spots in white rings here; secondly, on the underside of the hind-wings there are three or four bluish metallic spots near the hind margin, these are not at all represented in the Common Blue.

FAMILY IV. LYCÆNIDÆ.

POLYOMMATUS AGESTIS. THE BROWN ARGUS.

This frequents chalky and limestone localities; in the south it has the regular form of *Agestis*, but in the north it puts on the form of *Artaxerxes.*

The expansion of the wings is about 1 inch. The wings are of rich brown, with a marginal band of central spots in the southern form, *Agestis;* the fore-wings have a central black spot; in the northern form, *Artaxerxes,* this is replaced by a white spot.

On the underside in *Agestis* the white spots have black centres; in *Artaxerxes* the black centres are suppressed, the spots being entirely white.

The larva of *Artaxerxes* (which, through the kindness of Mr. Logan, I have had an opportunity of examining) is green, with a red line on each side; the dorsal line is dark green; the bristles are whitish, but on the second segment brown; on the back of the second segment is a pale spot, and there is one on each side of the back of the twelfth segment at the termination of the reddish lateral line; the head is shining black. This larva was feeding on *Helianthemum vulgare* (Common Sun Cistus), towards the end of May, and would appear in the perfect state in June and July. In the south of England *Agestis* is on the wing in May and August.

FAMILY V. HESPERIDÆ.

THYMELE ALVEOLUS. THE GRIZZLED SKIPPER.

(Plate II., Fig. 5.)

This pretty little species occurs pretty generally throughout the country, frequenting moist places in woods in May.

The expansion of the wings is 1 inch. All the wings are blackish, tinged with green, and with numerous rather square-shaped, creamy-white spots; the fringes are chequered blackish-green and white.

The larva is green or brown, with a dark dorsal line, white subdorsal lines, and white lateral lines; the head is brownish-black; it feeds on raspberry in July.

FAMILY V. HESPERIDÆ.

THANAOS TAGES. THE DINGY SKIPPER.

Common throughout the country on dry slopes of hills.

The expansion of the wings is from 1 inch to 1¼ inch. The fore-wings are dull brown, with two rather indistinct darker bands, and with a row of pale dots on the fringes of the hind margin; the hind-wings are dull brown, with a marginal row of pale dots.

The larva is pale green, with two yellow lines on each side, and with a row of black spots above each; it feeds, in June and September, on the bird's-foot trefoil.

The perfect insect appears in May and again in August; from its dull dark colour and short jerking flight, it is rather easily overlooked.

The pretty but local Chequered Skipper (*Steropes paniscus*) readily known by the rich dark brown wings, chequered with orange-tawny spots, occurs in June at Castor Hanglands, near Peterborough, and at Monk's Wood, Hants; at Stowmarket in Suffolk, and at Bourne in Lincolnshire.

FAMILY V. HESPERIDÆ.

PAMPHILA LINEA. THE SMALL SKIPPER.

Common and very generally distributed in the southern and midland counties, but less frequent further north.

The expansion of the wings is from 1 inch to 1¼ inch. The fore-wings are fulvous shot with brown, but without any paler markings; in the male there is an oblique darker patch from the middle of the inner margin,—a mark that is wanting in the female; the hind-wings are fulvous, shot with brown.

The larva is green, with two white dorsal lines and two white lateral lines; it feeds on various grasses in June.

The perfect insect appears in July, and frequents thickets and open places in woods.

Closely allied to this species is the Lulworth Skipper (*Pamphila Actæon*) which is almost entirely confined to one locality in Dorsetshire, Lulworth Cove. It appears in the perfect state in August, and might easily be overlooked for *Pamphila linea*, but the ground-colour of the wings is darker, and beyond the middle of the fore-wings is a curved row of fulvous spots.

FAMILY V. HESPERIDÆ.

PAMPHILA SYLVANUS. THE LARGE SKIPPER.

Generally common throughout the country, and with a more extended northern range than *Pamphila linea.*

The expansion of the wings is about 1¼ inch. All the wings are of a rich brown, with numerous indistinct fulvous blotches and spots; in the male, on the fore-wings there is an oblique darker patch from the middle of the inner margin.

The larva is of a dull green, with a darker dorsal line, it is dotted with black; the head is brown; on the underside of the tenth and eleventh segments are snow-white transverse spots; it feeds in May on meadow soft grass (*Holcus lanatus*) and various other grasses.

The perfect insect appears on the wing at the end of July and in August; it frequents thickets and the borders of woods.

There is one other Skipper closely allied to the preceding, the Pearl Skipper (*Pamphila comma*). It is, I believe, exclusively confined to chalky or limestone localities, but is generally very plentiful where it occurs; the short turf of many a chalk down is enlivened by its presence in the month of August. On the upper side it can hardly be distinguished from the Large Skipper (*Pamphila sylvanus*), but the pale markings at the tip of the fore-wings are a little paler than in that species, more of a whitish-fulvous; on the underside the distinction is readily seen, as *P. comma* is distinctly marked with square white spots.

MOTHS.

SPHINGINA. FAMILY I. ZYGÆNIDÆ.

PROCRIS STATICES. THE FORESTER SPHINX.

This species appears to be common throughout England and Ireland, though it is frequently so local that it will swarm in one field and not occur in any of the adjoining meadows.

The expansion of the wings is rather more than an inch in the male, rather less in the female. The fore-wings are of a bluish-green; the hind wings of a smoky brown. The antennæ of the male do not taper to a point, but have a blunt, almost club-shaped termination. The larva is greyish-purple, with the dorsal line whitish, edged with reddish-purple, and with a broad yellow stripe enlarged on each segment; it feeds on sorrel in April.

The perfect insect makes its appearance at the beginning of June, and may be met with up to near the end of July.

There are two other species very closely allied, *Procris globulariæ* and *P. Geryon*, but the differences are so minute that an unpractised eye would easily overlook them. *P. globulariæ* (Plate III. fig. 1), which occurs near Brighton and Lewes in June and July, has the tip of the antennæ of the male pointed; *P. Geryon* has occurred near Worcester, and in a few other localities.

FAMILY I. ZYGÆNIDÆ.

ANTHROCERA MINOS.

Abundant on the west coast of Ireland in June; has occurred at Clare and near Ardrahan in Galway.

The expansion of the wings is from 1 inch to 1¼ inch. The fore-wings are rather transparent bluish-green, with three irregular elongate crimson dashes; the hind-wings are crimson, with a very narrow purplish hind margin.

The larva feeds on bird's-foot trefoil and other papilionaceous plants in May.

The perfect insect makes its appearance towards the middle of June.

FAMILY I. ZYGÆNIDÆ.

ANTHROCERA FILIPENDULÆ. THE SIX-SPOT BURNET SPHINX.

(Plate III., Fig. 2.)

This pretty species is very plentiful throughout the country.

The expansion of the wings is from 1 inch to nearly 1½ inch. The fore-wings are of a beautiful greenish-blue, with six deep crimson spots, two close together at the base, two in the middle, sometimes joined together, and two beyond the middle, which are sometimes also confluent; the hind-wings are deep crimson, with a narrow purplish border along the hind margin.

The sluggish fat larva is pale yellow, more greenish on the sides, with two rows of large black spots on the back, and some smaller black spots on the sides, above the black spiracles; the black head is entirely retractile within the second segment. It feeds in May and June on various papilionaceous plants.

The perfect insect appears towards the middle of June, and may be met with throughout the following month, and sometimes in August; it frequents hayfields and pasture-meadows, grassy hill-slopes, and the heathery hill-sides of Scotland.

Besides the above, we have two species of Five-Spot Burnet Sphinges (*A. trifolii* and *A. loniceræ*); these have the first four crimson spots nearly as in *A. filipendulæ*, but have only one spot beyond the middle of the forewings instead of two. Both are widely distributed, though rather local, and appear in the perfect state towards the end of June or in July.

FAMILY II. SPHINGIDÆ.

SMERINTHUS OCELLATUS. THE EYED HAWK-MOTH.

This handsome insect occurs pretty commonly throughout the country, but seems to become scarcer in the north, and I do not think it has been noticed in Scotland; in Ireland it is scarce.

The expansion of the wings is from 2¾ to 3¼ inches. The fore-wings are of a pale rosy brown, clouded with olive markings; the hind-wings are rosy, shading into brown at the hind margin, with a large, round, bluish eye-like spot near the anal angle. which forms a beautiful contrast with the rosy ground-colour.

The larva has the skin rough and the head pointed; above it is apple-green, dotted with white, on each side are seven oblique white stripes, bordered above with dark green; the conical horn on the twelfth segment is rough, of a sky-blue colour, the tip being greenish or blackish. This handsome and conspicuous larva feeds on willow, poplar, apple, etc., in the month of August.

The perfect insect appears about the middle of May, and may be met with up to the beginning of July; we generally see it sitting on palings and trunks of trees, but its beautiful hind-wings are then concealed by the fore-wings, so that it has a sombre and gloomy appearance.

FAMILY II. SPHINGIDÆ.

SMERINTHUS POPULI. THE POPLAR HAWK-MOTH.

This is more plentiful than the preceding, and not restricted in its northern range, being common in Scotland; also common in Ireland.

The expansion of the wings is from 2¾ to nearly 3¼ inches. The fore-wings are ashy-grey, clouded with pale brown; the hind-wings are of a brick-red colour at the base, then pale brownish-grey.

The larva has the skin rough, and the head pointed above; it is apple-green, dotted with yellow, on each side are seven oblique yellow lines; it closely resembles the larva of the preceding species, but is distinguished by the colour of the rough, conical horn on the twelfth segment; this, instead of being sky-blue (as in the Eyed Hawk-moth) is yellowish above and reddish beneath. It feeds on poplar, aspen, sallow, etc., in the months of August and September.

The perfect insect appears towards the middle of May, and may be met with up to July; it sits on trunks of trees and palings, and always appears very sluggish by day; I have known it fly into houses at night, attracted by the lights.

FAMILY II. SPHINGIDÆ.

SMERINTHUS TILIÆ. THE LIME HAWK-MOTH.

(Plate III., Fig. 3.)

This is the smallest and most elegant of the genus *Smerinthus*, and it is the least plentiful, though sometimes it occurs in considerable numbers. It seems to be confined to the southern part of England.

The expansion of the wings is from about 2½ inches to 3 inches. The fore-wings are of a pale reddish-brown, shading into a very broad sandy-green hind margin; a large olive blotch on the middle of the costa, almost meets a smaller blotch of the same colour on the middle of the inner margin; on the costa near the tip is a small whitish blotch. The hind-wings are blackish at the base, then sandy-brown, intersected by an indistinct blackish band.

The larva has the skin rough, and the head pointed above; it closely resembles the larvæ of the two preceding species, but is distinguished at a glance by the following character: behind the horn there is a violet escutcheon bordered with orange, of which in the other two larvæ we see no trace. This larva feeds in August and September on elm and lime.

The perfect insect appears about the middle of May, and continues to come out during the following month; it is not so frequently observed on palings and trunks of trees as the two preceding species.

FAMILY II. SPHINGIDÆ.

ACHERONTIA ATROPOS. THE DEATH'S HEAD HAWK-MOTH.

This large and conspicuous insect occurs generally throughout the country; it is usually scarce, but in some particular years it occurs in greater numbers, and then the larvæ may easily be obtained.

The expansion of the wings varies from 4 to 5 inches. The fore-wings are blackish-brown, with indistinct tawny markings, but with a conspicuous yellow dot near the centre; the hind-wings are yellow with a narrow black band in the centre, and a broader black band on the hind margin. The broad thorax has an indistinct pale mark on it, resembling a skull (whence the name of Death's-head has been derived). The body is very large and thick, deep yellow banded with black, and with a broad bluish-black central stripe.

The larva, which grows to a length of five or six inches, may he immediately recognized by the form of its caudal horn; this is rough, at first inclined backwards but then recurved. No other Sphinx larva in this country has a horn of this form. The usual colouring of this larva is very beautiful; lemon-yellow, with the lower part of the sides and towards the head greenish; on each side are seven oblique violet stripes.

Occasionally a variety of the larva occurs of very different appearance, but the form of the caudal horn at once enables us to recognize it. Its principal food in this country is the potato; hence the larvæ or pupæ are occasionally met with in some numbers by those occupied in digging up potatoes. It also feeds on jasmine and on *Lycium barbarum* (a plant which in the midland counties seems very well known by the name of the "tea-tree"). The larva may be met with from the middle of July to the beginning of October; they seem, however, to occur most frequently about August.

The perfect insect is very rarely met with; sometimes it is found concealed amongst ivy; it has a great partiality for honey, and has been known to enter beehives in search of it. It possesses the power of squeaking, making a noise almost like a mouse.

FAMILY II. SPHINGIDÆ.

SPHINX LIGUSTRI. THE PRIVET HAWK-MOTH.

Very common throughout the southern and south-midland counties of England; scarcer as we advance northward, and hardly known in Scotland.

The expansion of the wings varies from 3½ to 4½ inches. The fore-wings are very pale brown, streaked with black and clouded with brown from the inner margin to the apex; the hind-wings are pale rosy, with three broad black bands.

The very beautiful larva is smooth, with the head rounded above; it is bright green; on each side it has seven oblique white streaks, bordered above with lilac; the horn is smooth and curved, it is shining black, with the underside of the lower half yellow. It feeds in August on privet and lilac.

The perfect insect appears in June and July; it flies at dusk with great rapidity, hovering over flowers whilst it extracts their sweets with its long tongue.

Allied to this is the Convolvulus Hawk-moth (*Sphinx Convolvuli*). It is rather larger, with all the wings grey, varied with darker markings. It appears at the end of August and in September; ordinarily, it is very scarce, but in the year 1846 it abounded throughout the country.

FAMILY II. SPHINGIDÆ.

DEILEPHILA GALII. THE GALIUM HAWK-MOTH.

This beautiful species is widely distributed throughout the country, but is never common, and scarcely extends its range to Scotland.

The expansion of the wings is from 2½ to 3 inches. The fore-wings are of a dark olive-green, with a broad paler hind margin, and with an irregular whitish streak extending from near the base of the inner margin to the tip of the wing; the hind-wings are rosy, with the base black, and with a narrow black marginal band; towards the anal angle they are whitish.

The very beautiful larva, which, when full fed, is about 3 inches in length, is of a dull greenish-grey, with a row of conspicuous pale spots on the sides, each placed in a broad black ring; the spiracles are yellow, and the horn, which is smooth, is bright red. It feeds on the yellow bed-straw (*Galium verum*), and may sometimes be tracked and collected on sand-hills where that plant grows profusely. Sometimes it is found in gardens feeding on the leaves of fuchsias.

The perfect insect emerges from the pupa between the middle of July and the middle of August. It is sometimes met with hovering over flowers at dusk.

There are two closely allied species, the Spurge Hawk-moth (*Deilephila euphorbiæ*), and the Striped Hawk-moth (*D. Livornica*); the former used to occur on the sand-hills at Braunton Burrows, near Bideford, but has not been met with for many years. The perfect insect closely resembles *Deilephila galii*, but the dark streak from the apex to the middle of the inner margin meets the inner margin much further from the base of the wing; the larva feeds on the sea spurges (*Euphorbia Cyparissias* and *Euphorbia Paralias*), which grow on sand-hills near the coast.

D. Livornica can be easily recognized by the veins of the fore-wings being distinctly whitish; it is a scarce species, but occasionally occurs in various parts of the country in May, August, and September.

FAMILY II. SPHINGIDÆ.

CHÆROCAMPA ELPENOR. THE ELEPHANT HAWK-MOTH.

This pretty species is very common throughout the southern and midland counties, but becomes scarcer as we advance further towards the north.

The expansion of the wings is about 2½ inches. The fore-wings are dull yellowish-green, with the costa, the hind-margin, and two oblique bands of a delicate rosy hue; the hind-wings are rosy, with the basal half blackish.

The larva is smooth, with the anterior segments retractile; it has a short caudal horn, black, with the tip white; it varies considerably in colour, being sometimes green, but generally dark grey marbled with black; the fifth and sixth segments have each a large black spot on each side, the upper portion of which contains a white kidney-shaped spot, nearly filled up with brown-grey; these eye-like lateral spots give the larva a very peculiar appearance. It feeds on willow-herb (*Epilobium*), vine, and fuchsia from the end of July to the beginning of September. In some marshy localities it is very plentiful.

The perfect insect appears in June, and may be sometimes noticed in gardens flying over flowers at dusk.

A species nearly allied to this, but very rare in this country is the Silver-striped Hawk-moth (*Chærocampa Celerio*). It is larger, the expansion of the wings being more than 3 inches; it has no rosy markings on the fore-wings, of which the ground-colour is pale brown; near the centre there is a black dot in a white ring. It has occurred in various parts of the country and in various months; in the larva state it feeds on the vine.

Another rarity in this genus is the Oleander Hawk-moth (*Chærocampa nerii*), which has only occurred a few times on the south coast. It is a large insect, the expansion of the wings being from 4 inches to 4½, and it is strikingly handsome, the fore-wings being of a pale rosy-grey, with several large blotches of dull green, irregular form, and more or less intersected with wavy, whitish streaks. The larva feeds on the Oleander.

FAMILY II. SPHINGIDÆ.

CHÆROCAMPA PORCELLUS. THE SMALL ELEPHANT HAWK-MOTH.

This occurs in various parts of the country, and seems to be most frequent in sandy, chalky, or limestone localities. Northwards it occurs on the slopes of Arthur's Seat, near Edinburgh.

The expansion of the wings is from 1¾ inch to 2 inches. The fore-wings are dull yellow, with the costa rosy, and a rosy central band, and a band along the hind margin rosy; the hind-wings are blackish towards the costa and inner margin, then dull yellow, with the hind-margin rosy.

The larva is smooth, with the anterior segments retractile, but at first sight we should hardly take it for a sphinx larva, as it has no caudal horn; like all the other larvæ of this genus it varies in colour, sometimes it is light brown, mottled with dark brown or black, sometimes it is light green, mottled with dark green or black; there is an eye-like spot on the sides of the fifth and sixth segments, and a few black dots serve to give an indication of a similar spot on the fourth segment. It feeds on the yellow bed-straws in July and August.

The perfect insect appears towards the end of May and in June, and is not unfrequently observed hovering at flowers at dusk.

FAMILY III. SESIIDÆ.

MACROGLOSSA STELLATARUM. THE HUMMING-BIRD HAWK-MOTH.

(Plate III., Fig. 4.)

This pretty and lively insect is common in most parts of the country, and often seen disporting itself in gardens.

The expansion of the wings is about 2 inches. The fore-wings are smoky-brown, with a central black dot, a waved black line on each side of it, and indistinct black clouds towards the base; the hind-wings are dull tawny, almost dull orange, with the base blackish-brown and the hind-margin reddish-brown; the body is brownish, beautifully varied with black and white posteriorly.

The larva is very variable in colour, green, purplish-brown or dark brown, dotted with white, with a darker dorsal and paler subdorsal lines, and a yellow or white line below the black spiracles; the caudal horn is rather short, rough, nearly straight, blue, with the tip yellow; the anterior legs are orange. It feeds on bed-straw in June, July, and August.

The perfect insect appears from May to September, and hybernated wasted specimens may be seen in the early spring, on bright sunny days; it flies briskly by day during the hottest sunshine, feasting on the honey of flowers, and darting away if we approach it too nearly.

FAMILY III. SESIIDÆ.

SESIA BOMBYLIFORMIS. THE NARROW-BORDERED BEE HAWK-MOTH.

(Plate III., Fig. 5.)

This is not scarce in many parts of the country, and occurs northward in the neighbourhood of Carlisle, and has occasionally been met with in Scotland down the Clyde.

The expansion of the wings is from 1½ to 1¾ inch. All the wings are transparent, with only the margins clothed with dense opaque scales. The fore-wings have the costa and a broad patch on the inner margin black tinged with green; the hind-margin is brown, broad towards the apex, narrow at the anal angle; the transparent patch near the base of the wing is not intersected by a longitudinal vein. The hind-wings have the base tinged with yellowish-grey, with the hind-margin brown, and very narrow. The body is greenish, with two black belts, posteriorly more yellowish.

The larva is green dotted with yellowish-white; with a subdorsal pinkish stripe, edged beneath with white from the third to the twelfth segment; the spiracles are reddish-brown, placed in pinkish blotches; the caudal horn is slightly rough, short, pointed, and reddish. It fields in July and August, on the devil's-bit scabious (*Scabiosa succisa*).

The perfect insects make their appearance in May; they fly swiftly in the daytime, extracting honey from flowers; they frequent open places in woods, or meadows by the skirts of woods. From the transparent wings and hairy bodies they have considerable resemblance to humble-bees.

There is another closely allied species of Bee Hawk-moth, the Broad-bordered Bee Hawk-moth (*Sesia fuciformis*); it appears in May, and frequents similar localities; it may be readily distinguished from the Narrow-bordered Bee Hawk-moth, by the greater breadth of the dark margin of the hind-wings, and that of the fore-wings at the anal angle; the transparent patch at the base of the fore-wings is intersected by a dark longitudinal vein. The larva feeds on honeysuckle in July.

Family IV. Ægeriidæ.

SPHECIA APIFORMIS. THE HORNET-MOTH.

This occurs in various parts of the country, and is common at Epping and Shrewsbury, and abundant at Cambridge. It is found as far north as the neighbourhood of Glasgow; also in the south of Ireland.

The expansion of the wings is about 1¼ inch. All the wings are transparent, only with the costæ of a yellowish-brown, and the hind-margins fringed with brown The head is yellow.

The larva is whitish-yellow, with the head blackish-brown. It feeds during the autumn and winter month on the stems and roots of poplar-trees.

The perfect insect appears towards the end of Ma and beginning of June, and continues out for some time It sits sunning itself on the trunks of poplar-trees, an looks then extremely like a hornet or large wasp.

There is another closely allied species, the Luna Hornet-moth (*Sphecia bembeciformis*) but the head, in stead of being yellow, is blackish, and the thorax i blackish with a yellow collar. In *Sphecia apiformis* th thorax is blackish above, with a yellow patch on eac side in front. The perfect insect appears in July. Th larva feeds on the wood of the sallow.

Family IV. Ægeriidæ.

TROCHILIUM CYNIPIFORME. THE YELLOW LEGGED CLEARWING.

This species occurs in some numbers on the trunk of oak-trees in Hyde Park; other localities given for i are Oxford, and Pembury, near Tunbridge Wells; it also has occurred near Bristol and Epping.

The expansion of the wings varies from less than three-quarters of an inch to very nearly an inch. The fore-wings are transparent, with the costa and hind-margin blue-black; the inner margin and transverse central spot are blue-black tinged with orange; the hind-wings are transparent, with black fringes; the head is black; the thorax also black, with a slender yellow collar, and a slender yellow stripe on each side; the abdomen is black, with four yellow rings, and the anal tuft is yellow mixed with black.

The larva is whitish, with the head brown; it feeds beneath the bark of oak-trees, and is full fed towards the end of April.

The perfect insect appears in the month of June, and is found sitting on the trunks of trees.

FAMILY IV. ÆGERIIDÆ.

TROCHILIUM TIPULIFORME. THE CURRANT HAWK-MOTH.

This species is common throughout the country, and being a garden insect, is extremely likely to be the first of the genus some of my readers will meet with.

The expansion of the wings is about three-quarters of an inch. The fore-wings are transparent, with the margins and central spot black tinged with orange; the hind-margin is distinctly streaked with orange; the hind-wings are transparent, with the margins narrowly black tinged with orange; the fringes rather paler; the head is black; the thorax also black, with a slender yellowish streak on each side; the abdomen is black, with three yellowish rings; the anal tuft is entirely black.

The larva is whitish, with a darker dorsal line; the head is pale brown, the hinder part of the head showing through the second segment; on the upper surface of the second segment, behind the lobe of the head, are two linear brown spots; it feeds from autumn to spring on the pith of currant-bushes, which hence assume a sickly appearance, and are sometimes killed by the attacks of these larvæ.

The perfect insect appears in June, and may be noticed sitting on the leaves of currant-bushes, or on flowers in their neighbourhood; though a sleepy-looking insect, it requires to be approached with caution, and the net should be used to effect its capture.

FAMILY IV. ÆGERIIDÆ.

TROCHILIUM MYOPÆFORME. THE RED-BELTED CLEARWING.

This species does not appear to be very widely distributed; localities indicated for it are Kingsbury, Epping, Lewes, and Bristol; it frequents old gardens, and may sometimes be met with in tolerably plenty.

The expansion of the wings is about three-quarters of an inch. The fore-wings are transparent, with the margins blackish; the hind-margin with a purplish tinge; the transverse central spot is blackish; the hind-wings are transparent, with the fringes blackish; the head and thorax are black; the abdomen is black, with a broad red belt; the anal tuft is entirely black.

The larva feeds on May in the stems and branches of apple-trees.

The perfect insect appears in June and July, and may be noticed on old apple-trees (especially espalier apples) sitting on the leaves; occasionally on flowers in the vicinity of apple-trees.

FAMILY IV. ÆGERIIDÆ.

TROCHILIUM CULICIFORME. THE LARGE RED-BELTED CLEARWING.

This species is probably widely distributed, though the localities hitherto assigned for it are not numerous; in the perfect state it is more frequently seen than caught; it frequents woods, in which there are birch-trees, and is most likely to occur where birches have been felled, and the growing stumps left in the ground. I believe it occurs in most woods round London.

The expansion of the wings is about one inch. The fore-wings are transparent, with the costa, hind margin, and transverse central spot blue-black; the inner margin towards the base is of a dull reddish (a character by which this species may be distinguished frem both our other Red-belted Clearwing Sphinges); the hind-wings are transparent, with the fringes blackish; the head and thorax are blue-black; the abdomen is blue-black, with a broad red belt; anal tuft blue-black.

The larva is whitish-yellow, with the second segment darker, the head is brown; it feeds in the winter and spring in the trunks and branches of birch, more rarely it occurs in alder.

The perfect insect appears at the end of May and beginning of June, and may be sometimes seen in the hottest sunshine, buzzing over birch stumps, and darting hastily away on the incautious approach of the collector.

We have eight other species of Clearwinged Sphinges, but the differences between them are very minute, and too intricate to be detailed here; the species figured (Plate III., Fig. 6) is the Flame-tipped Red-belt (*T. formicæforme*).

BOMBYCINA. FAMILY I. HEPIALIDÆ.

HEPIALUS LUPULINUS. THE COMMON SWIFT.

This species is extremely plentiful throughout the country.

The expansion of the wings varies from 1 inch to nearly 1½ inch. The fore-wings are of a pale brown, with a whitish streak from the base towards the inner margin, and with an interrupted whitish streak beginning nearly where the first leaves off, and running towards the apex of the wing; sometimes there is a distinct white spot on the disk between these streaks. The intensity of the markings varies extremely; in some specimens there are semi-transparent patches on the wings, in others all the white markings are suppressed. The female generally has the markings more indistinct. The fringes are always unspotted; the hind-wings are of a smoky-brown, with the fringes more tawny.

The larva is whitish, with the head shining brownish-yellow, and with a yellowish-brown plate on the back of each of the three next segments; it feeds underground, from autumn to spring, on the roots of various herbaceous plants.

The perfect insect appears towards the end of May, generally just when we see the first tufts of purple clover in blossom; it flies in meadows towards dusk with extreme swiftness, threading its way between the stems of the grass; sometimes we meet with it in extreme profusion, and then the grass seems alive with its mazy flight. When seen at rest (and we sometimes find it on palings or in houses whither it has been attracted by the light), it appears a most sluggish creature, and when we touch it it will probably fall down as though dead, no one would then conceive it was the *swift* of the previous evening.

FAMILY I. HEPIALIDÆ.

HEPIALUS HUMULI. THE GHOST MOTH.

Like the preceding, this is also abundant throughout the country.

The expansion of the wings of the male is about 2 inches, of the females sometimes as much as 2½ inches. The male has all the wings snowy-white, with the costæ and fringes brownish. The female has the fore-wings deep, dull yellow, with an oblique streak towards the hinder margin of a brick-red, and some irregular central spots of the same colour; the hind-wings are of a dull lead-colour, at the base shading into dull orange at the costa and hind margin.

The larva is whitish-ochreous, with the head reddish-brown, and a reddish-brown plate on the anterior part of the second segment; it feeds underground on the roots of hop, burdock, nettle, etc., from autumn to spring.

The perfect insect appears in the beginning of June, frequenting meadows, and other grassy places; the males have a peculiar flight, oscillating backwards and forwards like a pendulum, but remaining for some time at one spot; the females fly quite differently, and imitate the rapidly erratic movements of the pr species; sometimes a hundred males or more m simultaneously seen oscillating in one meadow.

We have three other species of Swifts. The G Swift (*Hepialus Hectus*) frequents moist places woods; the male has the same oscillating flight Ghost Moth, it is little more than an inch in tl pansion of the fore-wings, which are of a dull o with three oblique rows of whitish spots more o connected to each other; the Beautiful Swift (*He Velleda*) (Plate IV. Fig. 1), frequenting ferny place flying very swiftly after the fashion of the Co Swift, in June and July; a little later in the seas the end of July and beginning of August, the Ev Swift (*Hepialus sylvinus*) may be noticed; it is widely distributed throughout the country.

Family II. Zenzeridæ.

ZENZERA ÆSCULI. THE WOOD-LEOPA MOTH.

This is one of those species that seem to be comm in the immediate neighbourhood of London than where; sometimes it may be collected by dozens i parks; from its large size and conspicuous appea it is much persecuted by birds, and hence we frequ meet with the wings scattered on the ground. Pr cial localities which may be quoted for the Wood pard are Blandford, Brighton, Bristol, Epping, L Stowmarket, Tenterden, and York.

The expansion of the wings of the male is ab inches; of the female sometimes fully 2½ inches.

fore-wings are white, semi-transparent, with numerous blue-black spots. The hind-wings are very similar, but the spots are much less distinct; the thorax is white, with six large blue-black spots, three on each side; the abdomen is blue-black, more or less densely clothed with white scales, especially towards the base.

The larva is yellow, with shining black spots; the head has two black spots and the anterior half of the second segment is black. It feeds from the autumn to spring in the woods of various trees, elm, horse-chestnut, pear, apple, etc.

The perfect insect makes its appearance early in July.

FAMILY II. ZENZERIDÆ.

COSSUS LIGNIPERDA. THE GOAT MOTH.

This large insect seems widely distributed throughout the country, and very common in the south, though less frequent in the north.

The expansion of the wings is from rather less than 3 inches to more than 3½ inches. The fore-wings are of a pale brown, clouded with whitish, and marked with numerous short, irregular, wavy, transverse black lines; the hind-wings are pale smoky, with similar transverse dark lines, but less distinct.

The larva is reddish-black on the back, the sides are of a dull yellowish or flesh-colour; the head is black. It feeds on the wood of willows, poplars, and oaks, sometimes perforating the trees in all directions. It is said to live three years in the larva state, and if a tree infested by these larvæ be cut down in the winter, it will be found to contain larvæ of various stages of growth.

The peculiar disagreeable odour of this larva enables us to detect its presence at some distance.

The insect appears in the perfect state in July, and may be noticed resting on palings, or on the trunks of trees.

FAMILY III. NOTODONTIDÆ.

CERURA VINULA. THE PUSS MOTH.

This handsome insect is common throughout the country.

The expansion of the wings varies from 2½ to 3 inches. The fore-wings are whitish, with a transverse row of black spots near the base, followed by several wavy transverse grey lines, those beyond the middle being so deeply waved as to form a succession of < -like markings. The hind-wings are white in the male, clouded with grey in the female; in both sexes they have a dark central lunule.

The singular larva is dark green, with a hump on the fourth segment, behind which is a brownish blotch along the back; this blotch is edged with white, attains its greatest breadth at the eighth segment, where, however, it does not reach so low as to include the spiracles, and from that point it gradually diminishes towards the tail, where there are two projecting caudal appendages, from which the larva can at pleasure dart out long red filaments. (The anal prolegs in the larvæ of this genus are entirely wanting). This larva, which when young has even a more comical appearance than when full grown, feeds, in July and August, on the leaves of sallows, poplars, and willows.

The perfect insect appears in May or early in June, and may often be found resting on the trunks of trees or on palings.

There are three smaller species of the genus *Cerura* in this country—termed Kitten Moths,—the largest is less than 2 inches in the expansion of the wings; all three have a broad dark grey band in the centre of the fore-wings; but the differences between them are too minute to be detailed here.

FAMILY III. NOTODONTIDÆ.

STAUROPUS FAGI. THE LOBSTER MOTH.

A scarce species, though less so than formerly; it has occurred in various parts of the country, thus at Blandford, Epping, Exeter, Halton in Buckinghamshire, Lewes, Lyndhurst, Plymouth, etc.

The expansion of the wings is about 2¾ inches. The fore-wings are pale brown, more grey at the base, and with a reddish tinge towards the inner margin; at the base is a black dot; beyond the middle is a waved, indented, yellowish transverse streak; towards the hind-margin is a row of blackish spots; the hind-wings are greyish-brown, paler towards the base.

The most singular larva is reddish-brown, with two humps on each segment from the fifth to the ninth; the anal segments are carried erect, at right angles to the rest of the body; on the last segment are two short tails; there are no anal prolegs, and the second and third pairs of the anterior legs are remarkably long (a peculiarity by which the larva may be recognized at once); it feeds, in August and September, on beech, oak, and birch.

The perfect insect appears towards the middle of June, and may sometimes be found sitting on palings or trunl of trees; occasionally it is attracted by light.

Family III. Notodontidæ.

NOTODONTA ZICZAC. THE PEBBLE PROM NENT.

(Plate IV., Fig. 2.)

This insect seems pretty generally distributed throug out England, and occurs in the western part of Scotlan in Ireland it is not uncommon.

The expansion of the wings is from 1½ to 1¾ inc The fore-wings are pale brown, with a faint rosy tin towards the costa, and beyond the middle there is large oval patch of various shades of purple and brow with a strongly marked curved dark brown line on i basal edge; near the middle of the inner margin is short tuft of projecting black scales; the hind-wings a whitish-grey in the male, of a pale sooty-grey in t female.

The eccentric-looking larva is purplish-brown, wi humps on the back of the sixth, seventh, and twelf segments, and with darker patches on the front of the humps; on the sides are some paler oblique lines. feeds, in June and September, on sallows, willows, ar poplars; when resting, the head and tail are both el vated, which with the dorsal humps gives it a most si gular appearance.

The perfect insect appears towards the middle of Ma and again in August; it may sometimes be found a rest on palings or trunks of trees, and it comes rathe freely to light.

FAMILY III. NOTODONTIDÆ.

LEIOCAMPA DICTÆA. THE SWALLOW PROMINENT MOTH.

This insect seems pretty generally distributed throughout the country.

The expansion of the wings is about 2 inches. The fore-wings are whitish, varied with pale brown and dark brown; in the hind-margin are several linear whitish streaks, of which the lower one is wedge-shaped (in the closely allied Lesser Swallow Prominent the lower streak is distinctly triangular and white); the hind-wings are whitish, with a dark brown spot at the anal angle, separated from the fringes by a narrow whitish line.

The larva is whitish-green, with a broad pale-green lateral stripe, and a slender yellowish green stripe below the spiracles, the twelfth segment is slightly humped; a brown variety is sometimes found, without any lateral stripes; it feeds in September on poplars and willows.

The perfect insect appears in May and June, and may not unfrequently be found at rest on palings or trunks of trees.

FAMILY III. NOTODONTIDÆ.

DILOBA CÆRULEO-CEPHALA. THE FIGURE-OF-EIGHT MOTH.

(Plate IV., Fig. 3.)

Generally distributed throughout the country.

The expansion of the wings is between 1¼ and 1½ inch. The fore-wings are of a leaden grey, with a faint rosy tinge; in the middle of the wings between the two dark transverse lines are two kidney-shaped whitish spots towards the costa resembling the figure 8; the hind-wings are very pale-grey, with a darker transverse line and central lunule, and with a small black dash at the anal angle, which runs into the fringes.

The fat-looking larva is pale-yellow, with a broad lateral slaty-blue stripe (sometimes the stripe is pale green); the head is blue, spotted with black; it is not at all uncommon in June on hawthorn, but it does feed also on other plants. I once found a whole brood feeding on the common laurel. The perfect insect makes its appearance in September; it comes very freely to light, and on warm autumnal evenings, when the windows are open, it frequently enters houses.

FAMILY III. NOTODONTIDÆ.

CLOSTERA ANACHORETA. THE SCARCE CHOCOLATE-TIP.

(Plate IV., Fig. 4.)

This species, which had long had a legendary place in lists of British insects, was re-discovered some eight years ago by Dr. Knaggs, who bred the insect so freely that he most liberally supplied all our collections with the species; subsequently, the larva has been on several occasions noticed near Folkestone.

The expansion of the wings is about 1¼ inch. The fore-wings are greyish, with four slender transverse whitish lines, the fourth of which is extremely conspicuous towards the costa, as it there traverses the fuscous blotch which occupies the apical portion of the wing; the fuscous blotch contains within it a small tawny patch. In the allied *C. curtula* the fourth transverse pale line (the third line in both species is often very faint) precedes the chocolate-tip of the wing, and does not intersect it.

The larva is velvety-black mottled with grey, with a whitish dorsal line; the fifth and twelfth segments are humped, and the humps are of a bright chestnut-brown, —that on the fifth segment has a snowy-white spot on each side; it feeds on sallow and poplar in June and July.

The perfect insect makes its appearance in August and September.

FAMILY III. NOTODONTIDÆ.

PYGÆRA BUCEPHALA. THE BUFF-TIP.

(Plate IV., Fig. 5.)

This beautiful insect, so destructive in the larva state that it frequently strips the branches on which a brood of the larva is feeding, seems to be pretty generally distributed throughout the country.

The expansion of the wings is from 2¼ to 2½ inches. The fore-wings are purplish-grey, tinged with whitish towards the inner margin; before the middle is a black transverse line, preceded by a chocolate-coloured one; beyond the middle is a more wavy, black, transverse line, followed by a chocolate-coloured one; the entire apex of the wing is occupied by a large, pale ochreous spot, clouded with buff; the hind-wings are yellowish-white, with a pale, grey, central cloud; the thorax is dark ochreous, with two chocolate-coloured lines on each side and behind the middle; below these lines it is whitish-grey.

The larva is dark yellow, with a broad, black, dorsal line, and with three black lines on each side above the spiracles; the head, legs, and spiracles are black; it feeds gregariously in August and September on oak, lime, nut, sallow, etc.

The perfect insect appears in June and July; it is very sluggish; we sometimes meet with it sitting on grass, etc., or palings; it flies rather freely to light, and hence is sometimes found in houses.

Allied to several of the last-named species, there are various others which our space will not permit us to enumerate more particularly.

FAMILY IV. LIPARIDÆ.

PSILURA MONACHA. THE BLACK ARCHES.

(Plate V., Fig. 1.)

This pretty species is widely distributed in the south of England, and is, perhaps, most plentiful in the New Forest; it does not seem to range far towards the north, Barnsley and Doncaster being about its northern limit in Yorkshire; it is not uncommon in Ireland.

The expansion of the wings varies from 1½ to 2 inches, the females being generally much larger than the males. The fore-wings are white, with numerous, irregular, wavy, transverse black markings, and some black spots towards the base and along the hind-margin; the hind-wings are dull grey. The terminal half of the body is pinkish in both sexes; in the female it is very pointed, and furnished with a protruding ovipositor adapted for depositing the eggs in the crevices of the bark of trees.

The larva is yellowish-grey, varied with greenish-grey and dull brown; the dorsal warts are large and black, each wart bearing a tuft of bristly hairs; it feeds on oak, fir, and other trees, in May and June.

The perfect insect makes its appearance in July and August, and may sometimes be found resting on the trunks of trees, its contrast of colour making it very conspicuous.

FAMILY IV. LIPARIDÆ.

DASYCHISA PUDIBUNDA. THE PALE TUSSOCK MOTH.

This species, of which the larva is so remarkably handsome, is generally distributed throughout the country.

The expansion of the wings varies from 1¾ to 2¼ inches. The fore-wings are pale grey; near the base is a short, blackish, transverse streak; before the middle is a slender black band, and beyond the middle is a slender, curved transverse line; between these lines is a faintly darker central spot, somewhat kidney-shaped; towards the hind-margin are a few darker clouds; the hind-wings are whitish-grey (more whitish in the female), with a transverse greyish band, and greyish central lunule.

The beautiful larva is either pale yellowish-green or reddish-yellow; strongly contrasted with the general colour are the incisions between the fifth to eighth segments, which are of a rich, velvety-black; each of the fifth to eighth segments has a dense tuft of yellow hairs on the back, and the twelfth segment has a longer and more slender tuft of a dull reddish; it feeds on various trees and shrubs in August and September.

The perfect insect makes its appearance at the end of

May and beginning of June; it may often be noticed on the trunks of trees and on palings.

The Dark Tussock (*Dasychira fascelina*), though less generally distributed, is common in heathy situations where it occurs; the larva passes the winter and feeds up in the spring, whereas the larva of the Pale Tussock enters the pupa state before winter.

FAMILY IV. LIPARIDÆ.

ORGYIA ANTIQUA. THE VAPOURER.

A very abundant insect, which may be seen flying along the streets of London any fine day in August and September.

The expansion of the wings of the male averages about 1¼ inch. (The females of this genus have no apparent wings, but only small rudimentary appendages.) The fore-wings of the male are of a rich brown clouded with darker brown, with a small white spot near the anal angle; the hind-wings are of a rich brown.

The larva is curiously tufted, and has a very singular appearance; it is slaty-grey, with four or five red warty spots on each segment; there is a short tuft of ochreous-brown hairs on the back of each of the fifth to the eighth segments; a long yellow tuft on the sides of the fifth segment, and a blackish tuft on the sides of the sixth segment; moreover, on the second segment are two long blackish tufts pointing forwards (like horns), and on the twelfth segment is another long tuft pointing backwards. The larva, which is plentiful in all our gardens, may be found on all sorts of trees and shrubs, from June to September.

The males, which fly briskly by day, may be constantly seen on the wing in fine weather from July to October. The females never move from the cocoons in which they had passed the chrysalis state, and deposit their eggs on the outside of the cocoon.

The Scarce Vapourer (*Orgyia gonostigma*) (Plate V., Fig. 2) is very similar to the preceding, but the fore-wings of the male have several small white spots near the tip, and also a small orange spot near the costa, and the hind-wings are considerably darker.

The larva feeds on oak, hazel, and bramble in autumn, and hybernating small, feeds up in the spring. The perfect insect appears in June.

FAMILY IV. LIPARIDÆ.

STILPNOTIA SALICIS. THE WHITE SATIN.

A common species generally, though perhaps more frequently observed in the larva state.

The expansion of the wings is about 2 inches. All the wings are satiny-white, spotless, rather transparent.

The legs are black with white rings.

The pretty hairy larva is whitish, with a black line on each side of the back, interrupted by a row of velvety tubercles; a row of similar tubercles runs along the sides, which are of a bluish-white, dotted with black. It feeds on poplars and willows in May and June.

The perfect insect makes its appearance towards the end of July and beginning of August.

FAMILY IV. LIPARIDÆ.

PORTHESIA AURIFLUA. THE GOLD TAIL.

Very plentiful throughout the south of England, and extending almost to the border; common in Ireland.

The expansion of the wings varies from 1¼ to 1¾ inch, the females being generally considerably larger than the males. The fore-wings are of a satiny-white, opaque, with a brownish-black spot near the anal angle; the hind-wings are spotless white; the anal tuft of the abdomen is yellow.

The larva is black, with small humps on the fifth, sixth, and twelfth segments, which interrupt the reddish dorsal line; along the reddish subdorsal lines is a row of white spots, and a reddish line above the legs; on each side of the head is a tuft of hair proceeding from a little fleshy protuberance. It feeds on various plants (hawthorn, rose, fruit-trees, oak, etc.); it is hatched in autumn, and feeds for a short time before retiring for the winter; it emerges from its retreat in May, and feeds during that and the following months.

The perfect insect makes its appearance in August, and may often be observed sitting on palings or hedges, or flying at dusk.

The closely allied Brown Tail (*Porthesia chrysorrhœa*) is distinguished at a glance by the different colour of the anal tuft; the fore-wings are often destitute of the black spot.

The habits of the two species are very similar; but the Brown Tail has occasionally occurred in such multitudes as to cause great devastation in orchards.

FAMILY V. LITHOSIDÆ.

LITHOSIA COMPLANULA. THE COMMON FOOTMAN.

(Plate V., Fig. 4.)

This pretty insect is very common and very generally distributed in the south of England, but does not extend its northern range into Scotland.

The expansion of the wings is 1¼ inch. The fore-wings are of a leaden-grey, with a slender yellow stripe along the costa, of equal width to beyond the middle of the wing and there attenuated to a point at the tip (in the closely allied, but much rarer *Lithosia complana,* this stripe remains of equal width all the way to the hind-margin).

The larva is black, with an orange stripe on each side from the sixth to the twelfth segments above the legs. It feeds on the lichens growing on walls, palings, and trunks of trees in autumn and spring.

The perfect insect appears in July; it comes very freely to light, and hence it is often found in houses.

There are several other species of the genus *Lithosia,* —the deep dull yellow *aureola,* the pale ochreous *stramineola,* the pale grey *griseola,* etc. *Aureola* may often be obtained by beating fir trees in June and July; the others are most frequently obtained flying at dusk.

FAMILY V. LITHOSIDÆ.

ŒNISTIS QUADRA. THE LARGE FOOTMAN.

This is not a common species, though widely distributed, and occurs as far north as Scarborough; it is perhaps most plentiful in the New Forest.

The expansion of the wings is about 1¾ inch.

The two sexes are very different in appearance: the male has the fore-wings of a dull grey, becoming darker towards the hind margin; the base is yellow, with a black blotch on the costa. In the female the fore-wings are of a deep yellow, with two conspicuous black spots beyond the middle.

The larva is of a blackish-grey, with a double, indented yellow line on each side of the back; along this line are placed scarlet hairy warts; on the second, seventh, and last segments are black spots; it feeds on lichens growing on the trunks of oak, beech, etc., in May and June.

The perfect insect makes its appearance in July.

Family V. Lithosidæ.

GNOPHRIA RUBRICOLLIS. THE BLACK FOOTMAN.

A very abundant species throughout the country, and occurring north at any rate as far as Dumfriesshire.

Expansion of the wings 1 inch to 1¼ inch. All the wings are of a uniform dull, smoky black; the abdomen is black, except the four or five last segments, which are yellow; but the character from which it takes its specific name is the red colour of the front portion of the thorax, which is otherwise black.

The larva is of a greenish-grey, streaked and spotted with black; the tubercles are reddish; the head is black with two white lunate marks. It feeds on various lichens, especially those on the trunks of beech-trees, in the autumn.

The perfect insect makes its appearance at the end o May and beginning of June.

Family V. Lithosidæ.

PHILEA IRRORELLA. THE DEW MOTH.

This delicately pretty species is not uncommon i many localities, but principally on chalk or limestone; it has occurred as far north as Oban.

The expansion of the wings varies very considerably; I have specimens less than three-quarters of an inch, others nearly an inch and a half in expanse. The fore-wings are semi-transparent, dull yellow, with three oblique rows of black dots, the third row being sometimes only represented by one or two spots near the hind-margin; the hind-wings are rather paler, with one or two blackish dots at the outer angle.

The larva is black, with a yellow dorsal line of lozenge-shaped spots. It feeds on various lichens in May.

The perfect insect makes its appearance about the middle of June, and it may be met with till July is well advanced. It flies freely about sunset, but directly it is caught it falls to the bottom of the net, as though dead; and if struck and not caught it is very apt to fall down in the grass and thus escape the search of the collector.

FAMILY VI. CHELONIDÆ.

HYPERCOMPA DOMINULA. THE SCARLET TIGER.

(Plate V., Fig. 3.)

This magnificent species does not seem to be generally distributed; it occurs at Epping, Halton in Buckinghamshire, Bristol, Ashburton, and in the Cambridgeshire Fens.

The expansion of the wings is from 2 to 2¼ inches. The fore-wings are of a dark green, with conspicuous yellow and white spots; the hind-wings are crimson, with black spots towards the margins.

The larva is also very pretty, it is black with a broad pale yellow stripe on the back, and one on each side much intersected by the black ground-colour, it is clothed with short blackish hairs, placed on shining black warts. It feeds on numerous low plants in autumn and spring, being fed up towards the end of May.

The perfect insect makes its appearance in June or early in July.

FAMILY VI. CHELONIDÆ.

EUTHEMONIA RUSSULA. THE CLOUDED BUFF.

This is common and generally distributed, occurring in heathy places, especially amongst fern.

The expansion of the wings of the male is 1¾ inch; (the female is only 1½ inch in expanse, thus actually smaller than the male). The fore-wings of the male are pale yellow, with the margins reddish; a central blackish spot is margined with reddish towards the costa; the hind wings are paler, with a broad blackish band near the hind-margin, and blackish central spot; the female has all the wings of a deeper colour, and the fore-wings are veined with reddish-orange.

The larva is of a brown-black, with its dorsal lin yellow, spotted with red, and with white spiracles; th hairs are reddish; it feeds on various low plants in th autumn and spring.

The perfect insect appears in the month of June an flies freely by day.

FAMILY VI. CHELONIDÆ.

ARCTIA CAJA. THE GARDEN TIGER.

This handsome insect is common throughout th country; it is extremely abundant in some places.

The expansion of the wings varies from 2¼ to 2¾ inches. The fore-wings are brown, with numerous whitish streaks irregularly ramified, and some whitish spots; the hind-wings are of a deep reddish-orange, with six or seven spots of a blue-black.

The larva is black, with long white hairs along the back, and with reddish-brown hairs along the sides and on the anterior segments; the head and legs are black. When the larva is young, the hairs are entirely of a rusty-brown colour. It feeds on various low plants in the autumn and spring, the full-fed larvæ occurring in May and at the beginning of June.

The perfect insect appears in July, but is far less frequently seen than the larva; it comes rather freely to light, and thus finds its way into houses.

FAMILY VI. CHELONIDÆ.

ARCTIA VILLICA. THE CREAM SPOTTED TIGER.

(Plate V., Fig. 5.)

This beautiful insect is not scarce in the south of England, where it seems very generally distributed; but its northern range seems very limited, scarcely reaching the midland counties; it is rare in Ireland.

The expansion of the wings varies from about 2 to 2½ inches. The fore-wings are rich velvety black, with about eight creamy-white spots; the hind wings are of a deep yellow with four or five small central black spots, and an irregular black patch at the anal angle.

The larva is black, with brown hairs; the head and legs are of a dull reddish,—a character by which it may be at once distinguished from the larva of the preceding species. It feeds on various low plants in autumn and spring, being full fed between the middle of April and beginning of May.

The perfect insect appears in the month of June.

FAMILY VI. CHELONIDÆ.

NEMEOPHILA PLANTAGINIS. THE WOOD TIGER.

Not a scarce species, and generally distributed, extending far into Scotland, and is generally distributed in Ireland.

The expansion of the wings is about 1¼ inch. The fore-wings are black, with whitish streaks and spots, which are tinged with yellow at the margins; the hind-wings are of a dull deep yellow, with the base and the inner margin black, and with four or five black spots near the hind-margin.

The larva is dull brown, with blackish hairs in front and posteriorly, in the middle with ferruginous hairs. It feeds on plantain in autumn and spring.

The perfect insect makes its appearance at the end of May and beginning of June; it frequents woods and heaths, flying briskly in the afternoon.

FAMILY VI. CHELONIDÆ.

PHRAGMATOBIA FULIGINOSA. THE RUBY TIGER.

Not scarce, and generally distributed throughout the country.

The expansion of the wings is about 1¼ inch. The fore-wings are reddish-brown, with a black spot on the disk beyond the middle; the hind-wings are blackish or dull pink, with the hind-margin and two central spots black.

The larva is rusty-brown, with brownish hairs. It feeds on various low plants in the autumn and spring; it seems rather partial to ragwort (*Senecio Jacobæa*).

The perfect insect appears in June and July; occasionally it comes to light.

FAMILY VI. CHELONIDÆ.

SPILOSOMA MENTHASTRI. THE WHITE ERMINE.

An abundant species throughout the country.

The expansion of the wings is from 1½ to 1¾ inch.

The fore-wings are whitish, with more or less of a yellow tinge, and with numerous small black dots, arranged rather in four curved transverse rows; the hind-wings are white, with one central and several marginal black spots. The abdomen is yellow, with a central row of black spots, and black spots on the sides.

The larva is black, with long brown hairs, and an orange stripe straight along the back; it feeds on all sorts of low plants in August and September.

The perfect insect appears in the beginning of June, and continues out for some time; it comes very freely to light, and hence is often found in houses.

The closely allied, but much scarcer *Spilosoma papyratia*, the Water Ermine, has only a few black spots on the fore-wings, and the hind-wings are altogether spotless; it rather frequents moist places, such as sides of canals, etc.

FAMILY VI. CHELONIDÆ.

SPILOSOMA LUBRICEPEDA. THE BUFF ERMINE.

Very abundant in the south and indeed common throughout England, but not extending its range as far north as Scotland; in Ireland it is common.

The expansion of the wings varies from 1½ to 1¾ inch. The fore-wings are pale ochreous, with several black dots, two or three of which are near the base, two near the middle of the costa, and others almost form a streak from the middle of the inner margin to the tip of the wing; the hind-wings are rather paler, with two or three black spots.

The larva is whitish, with long, pale, brown hairs; on each side of the slender, whitish, dorsal line, is a broad dark-grey stripe, and on the sides are oblique stripes of a pale grey; it feeds on all sorts of low plants in August and September, and can run with great rapidity.

The perfect insect makes its appearance in June and July.

FAMILY VI. CHELONIDÆ.

DIAPHORA MENDICA. THE SPOTTED MUSLIN.

This curious species, of which the male is black and the female white, is not uncommon throughout the country.

The expansion of the wings is from 1¼ to 1½ inch. The male is entirely of a smoky black, with eight or ten black spots irregularly placed on the fore-wings and with one central and several marginal black spots on the

-wings. The female is entirely of a smoky-white different from the creamy colour of the White ne); the wings are spotted with black, as in the The whitish colour of the abdomen spotted with readily distinguishes it from the White Ermine, ich the abdomen is yellow, spotted with black.

e larva is greyish-brown, with a paler dorsal line, ith the head and legs reddish; it feeds on various lants in the autumn.

e perfect insect appears towards the middle of May eginning of June. The female may sometimes be flying by day; the male is more frequently taken ht; it comes occasionally to light.

FAMILY VI. CHELONIDÆ.

LIMORPHA JACOBÆÆ. THE CINNABAR MOTH.

pretty species, and common throughout England reland; it occurs in Scotland, but not in any plenty. e expansion of the wings is about 1¼ inch. The ings are of a smoky-grey, with a narrow red stripe the costa, and two red spots towards the hind in; the hind-wings are red, with the margin ish.

e larva is slightly hairy, black, with orange-yellow ; it feeds in July and August on the ragwort (*Se- Jacobæa*), generally in great numbers together, so where found it is always easy to collect a hundred o of the larvæ. On the sandhills at Braunton ows it occurs literally in thousands.

e perfect insect makes its appearance at the end of and beginning of June.

Family VII. Bombycidæ.

LASIOCAMPA RUBI. THE FOX MOTH.

Common throughout the country, particularly in heathy places.

The expansion of the wings of the male is about 2 inches—of the female nearly 2½ inches. All the wings are of a reddish-brown (more of a purplish-brown in the female), with two pale yellowish, slender, transverse lines near the middle of the fore-wings.

The larva is golden-brown on the back, black between the segments; it is clothed with rather long hairs when it is only about half grown it is black with yellowish rings; it feeds on heath and various low plants in the months of August and September.

The perfect insect appears at the end of May and beginning of June; the males fly swiftly and wildly towards dusk; they may easily be attracted in numbers by means of a bred specimen of the female.

Family VII. Bombycidæ.

LASIOCAMPA TRIFOLII. THE GRASS EGGAR

This species seems fond of sea-breezes, and has generally been found in the greatest plenty on the coast, as at Plymouth, Lytham in Lancashire, and Eastbourne.

The expansion of the wings varies from 2 to 2½ inches. The fore-wings are of a pale reddish-brown, with a central white spot on the disk; between it and the base is generally a faint, pale band, and beyond the middle is a narrow, curved, yellowish band, which goes from the costa, near the tip, to the middle of the inner margin (the position of this band is much more oblique than in the Oak Eggar).

The larva is black, with a bluish-white stripe on each side of the back, and an orange-red spot on the sides of the third and fourth segments; the hair on the back is pale, tawny—on the sides, greyish; it feeds on clover, lucerne, melilot, broom, etc., in autumn and early summer, being full fed about June.

The perfect insect makes its appearance in the month of August.

FAMILY VII. BOMBYCIDÆ.

LASIOCAMPA QUERCUS. THE OAK EGGAR.

This fine insect is very abundant throughout the country; it is, perhaps, most plentiful on heaths and moorlands.

The expansion of the wings of the male is about 2¼ inches, of the female nearly 3 inches.

The male has the fore-wings of a rich chocolate-brown, with a central white spot on the disk, and a broad, slightly wavy, deep yellow band, which shades into chocolate towards the hind margin; a continuation of this band runs across the hind-wings; sometimes there is an ochreous blotch at the base of the fore-wings. The female is very much paler, almost tawny, but the markings are similar, only the pale band is much less conspicuous.

The larva is black, with rusty-greyish hairs; on each side is a white stripe above the spiracles, and on the third and fourth segments, above this stripe, is a white spot with a red centre; it feeds on a great variety o plants in autumn and spring, the full-fed larva occurring in May.

The perfect insect appears in July and August.

Closely allied to this, and sometimes reputed a simpl climatic variety of it, is the *Lasiocampa callunæ* (Heat Eggar), which abounds on the heathery hills of Scotlan and also occurs in Cornwall and Devonshire.

The perfect insect is darker; it flies in June; the larvæ are full fed in September, and having passed one winter as young larvæ, pass the second winter in the pupa state.

Family VII. Bombycoidæ.

ERIOGASTER LANESTRIS. THE SMALL EGGAR.

This insect seems generally distributed throughout the country, but is of rare occurrence in Scotland, where it has been noticed down the Clyde; it is not scarce in Ireland.

The expansion of the wings is about 1½ inch. The fore-wings are of a pale purplish-chocolate, with a white spot at the base and another in the centre of the disk towards the hinder margin is a slender, rather wavy pale band.

The larva is blue-black, with a row of tawny tufts o each side of the back, a pale yellow sinuous lateral lin and a pale yellow transverse streak from it at the hinde edge of each segment, almost meeting on the back; leg black, the prolegs brick-red; it feeds gregariously (tw or three hundred together) on sloe, hawthorn, etc., i May and June.

The perfect insect appears in February, but I fancy is not often met with at large.

FAMILY VII. BOMBYCIDÆ.

PŒCILOCAMPA POPULI. THE DECEMBER MOTH.

This species is pretty generally distributed throughout England and Ireland, but is not generally very common.

The expansion of the wings is about 1½ inch. The fore-wings are of a bluish-black, with a dull orange patch at the base, externally bordered by a slender yellowish white line; beyond the middle is another slender, curved, and much indented band of a yellowish-white; the fringes are reddish-brown, spotted with yellowish-white.

The larva is grey marbled with ochreous, with a dark grey band on each segment, in which are several small whitish spots; on the back of each segment are two red spots; the subdorsal lines are orange, but interrupted; it feeds in May and June on hawthorn, poplar, lime, and oak, and is often met with in the crevices of the bark.

The perfect insect makes its appearance towards the end of November and in December; it comes occasionally to light.

FAMILY VII. BOMBYCIDÆ.

TRICHIURA CRATÆGI. THE PALE OAK EGGAR.

This species is widely distributed, and occurs at least as far north as the county of Ayr, but is rarely found in any plenty; in Ireland it occurs at Killarney.

The expansion of the wings is about 1¼ inch. In the male the fore-wings are of a pale grey, with a broad darker central band, which on the inner margin is expanded till it reaches the base, the margins of the band are expressed by black lines. In the female the ground-colour is dull brownish-grey, with the central band only a little darker, and the black lines are wanting.

The larva is bluish-black; with red spots along the back, connected by whitish stripes, and with a lateral row of white spots; it feeds in May and June, on hawthorn, sloe, and sallow.

The perfect insect appears in September; it comes occasionally to light.

FAMILY VII. BOMBYCIDÆ.

CLISIOCAMPA NEUSTRIA. THE LACKEY.

The insect used to be excessively abundant throughout the south of England, but it is now (1867) very much scarcer than formerly, and I have not seen eithe larva or perfect insect for several years.

The expansion of the wings of the male is about 1 inch, of the female about 1½ inch. The ground-colou of the wings varies considerably, from pale ochreous t a sandy red; on the fore-wings are two transvers brown lines near the middle, both terminating on th inner margin, the intervening space is sometimes darker and in the darker coloured specimens they are generall edged with a paler band than the ground colour.

The larva is very gaily coloured; on the back is bright white dorsal line, then a broad orange stripe, i which are included a black stripe and a blue one, an then follows a silvery blue stripe; it feeds in May an June on fruit-trees, hawthorn, sloe, etc. When youn it is gregarious, but the larvæ disperse before they ar full fed.

The perfect insect appears in July and August; it comes very freely to light.

The closely allied Ground Lackey (*Clisiocampa castrensis*) may be distinguished in the male by the pale ochreous fore-wings, having the inner border of the central dark band carried in a curve to the base of the wing, as in *Trichiura cratægi,* and by the hind-wings being much darker than the fore-wings. It occurs on the banks of the Thames below Erith.

FAMILY VII. BOMBYCIDÆ.

ODONESTIS POTATORIA. THE DRINKER.

Very common throughout the country, and occurring freely in Scotland and Ireland.

The expansion of the wings varies from 2 to 2½ inches. The male is of a reddish-yellow; the fore-wings have two darker transverse lines, one near the base, the other obliquely from near the apex of the costa to the middle of the inner margin; in the central portion of the wings are two white spots, placed one above the other. The female is very much paler, sometimes almost pale ochreous, but the markings are similar.

The larva is dull, dark bluish-grey, with subdorsal lines of orange spots; along the spiracles are short white tufts of hair, and oblique orange streaks; it feeds on various grasses, on sloping hedgebanks; it commences feeding in autumn, and may sometimes be seen alert in the middle of winter, if the weather be very mild; in the months of April and May it grows very rapidly, and is fed up towards the end of the latter month.

The perfect insect appears in July and August; it occasionally enters houses, attracted by light.

FAMILY VII. BOMBYCIDÆ.

GASTROPACHA QUERCIFOLIA. THE LAPPET MOTH.

This handsome species occurs in many parts of th south of England, and is certainly common near Cambridge, though generally it occurs more sparingly. It does not seem to extend its range far to the north.

The male is much smaller than the female, and is often hardly more than two inches in expanse, the female expands fully three inches. It is entirely of a brownish-red clouded with black, on the fore-wings there are three angulated, indented, transverse lines, and a central black spot.

The larva is extremely variable in colour, but is best recognized by the incisions between the second and third, and third and fourth segments being blue-black on the sides there is a more or less distinct whitish stripe; it commences feeding in autumn, and feeds up in April and May; it is found on sloe, willow, and othe trees and shrubs.

The perfect insect appears at the end of June and in July; it is fond of light, and often comes into houses when we have a good opportunity of observing its peculiar position in repose, the front edge of the hind-wing projecting considerably beyond the front edge of the fore-wings.

The pretty little allied species *Gastropacha ilicifolia* of which the expansion of the wings is only about 1 inch, frequents moorlands, where bilberry (*Vaccinium Myrtillus*) grows in profusion; the larva feeds on bilberry in the autumn, and the perfect insect appears in May.

FAMILY VIII. ENDROMIDÆ.

ENDROMIS VERSICOLORA. THE KENTISH GLORY.

This handsome insect occurs in several parts of the country, and is sometimes tolerably plentiful. Ashdown Forest is perhaps the best southern locality for it, and Rannoch, in Scotland; in Ireland it occurs at Powerscourt.

The expansion of the wings is about 2½ inches.

The fore-wings are orange-brown, prettily marked with black and white; before the middle is a curved, black, transverse line, inwardly bordered with white, beyond the middle is a second, black, transverse line, much indented in its lower half, it is edged with white on the outside, between these two lines is a V-shaped black mark on the disk, and beyond the second line are some white blotches towards the costa, and whitish streaks running into the hind margin.

The larva, not hairy, is whitish-green, rather humped on the twelfth segment; on each side of the back are ten oblique white streaks (reminding one of a *Sphinx* larva); it feeds on birch in July and August.

The perfect insect appears in April, and flies briskly in the daytime.

FAMILY IX. SATURNIDÆ.

SATURNIA PAVONIA-MINOR. THE EMPEROR MOTH.

This handsome species is common throughout the country.

The expansion of the wings of the male is about 2¼ inches, of the female about 2¾ inches. The male has the fore-wings rosy-brown, with some transverse darker lines; in the centre is a conspicuous eye-like spot, consisting of an outer black ring, then on the basal side a whitish crescent, then a yellow ring, which encircles a black spot, in which a paler crescent is sometimes perceptible on the side towards the base; the hind wings are dull orange, darker at the base, and with a dark band towards the hind margin, and with a similar central eye-like spot. The markings of the female are similar, but the ground-colour of all the wings is of a soft grey.

The handsome larva is green; on each segment are seven pink tubercles in black rings, a tuft of black hairs springs from each tubercle; the spiracles are orange; it feeds on heath and various low plants in August and September.

The perfect insect appears in May.

FAMILY X. PLATYPTERYGIDÆ.

CILIX SPINULA. THE CHINESE CHARACTER.

This curious little insect is common throughout the country.

The expansion of the wings is barely an inch. The fore-wings are white, with a large brown blotch on the middle of the inner margin, and towards the middle of the wing is a large, oval, greenish-grey blotch.

The larva, with no anal prolegs, is dull chocolate-brown, with a dark tawny blotch on the back; it is very common on the leaves of sloe and hawthorn, at the end of May and at the end of July.

The perfect insect may often be noticed sitting on palings, and flies freely towards dusk at the end of May and in August.

FAMILY X. PLATYPTERYGIDÆ.

DREPANA FALCATARIA. THE PEBBLE HOOK-TIP.

This species is very generally distributed, though nowhere very abundant; it occurs northwards as far as the Clyde; in Ireland it is common.

The expansion of the wings is about 1¼ inch. The fore-wings are of an ochreous tinge, with three wavy transverse blackish lines, in the third of which is a central blue-black blotch; a reddish-brown slender streak runs from the inner margin to the hooked tip of the wing; hind-wings paler ochreous, with wavy transverse grey lines.

The larva, with no anal prolegs, is pale green, with a broad, dark red-brown stripe on the back; it feeds in June and September on birch, alder, etc.

The perfect insect appears in May and August.

There are several other species of the Hook-tips, one of which has the hind margin of the fore-wings much jagged, *Platypteryx lacertinaria,* and another is very abundant in beech woods, the larva feeding on the leaves of that tree.

NOCTUINA. FAMILY I. NOCTUI-BOMBYCIDÆ.

THYATIRA BATIS. THE PEACH BLOSSOM.

(Plate VI., Fig. 1.)

This very pretty species is common nearly throughout the country, extending its range a long way into Scotland; in Ireland it is very common.

The expansion of the wings is about 1½ inch. The fore-wings are of an olive-brown, with five delicate pink spots, one at the base, two on the inner margin, and two on the costa beyond the middle.

The larva is reddish-grey, marbled with brown, with a tubercle on the third segment, and smaller tubercles on the sixth to tenth segments; it feeds on bramble in August and September.

The perfect insect makes its appearance in June, and continues to occur in July; it comes very freely to sugar, and may also frequently be caught on the wing after dusk.

FAMILY I. NOCTUO-BOMBYCIDÆ.

CYMATOPHORA FLAVICORNIS. THE YELLOW-HORNED.

(Plate VI., Fig. 2.)

This early species is generally common amongst birch-trees throughout the country.

The expansion of the wings is about 1½ inch. The fore-wings are of a pale greenish-grey, varied with darker, with several transverse dark lines, namely, three before and two beyond the middle; the hind-wings are of a greyish-brown.

The larva is pale whitish-green, with whiter dots, rather darker between the segments; it feeds between united leaves of birch in September.

The perfect insect appears from the middle to the end of March, and may be found sitting on palings or trunks of trees by day, or flying at dusk; it comes freely to sugar.

FAMILY II. BRYOPHILIDÆ.

BRYOPHILA PERLA. THE MARBLED BEAUTY.

(Plate VI., Fig. 3.)

This pretty little species seems common, and generally distributed throughout the country.

The expansion of the wings is about an inch. The fore-wings are white or whitish, prettily dappled with bluish-grey

The larva is bluish-black, with a broad orange dorsal stripe; it feeds on the lichens growing on old walls, rocks, etc., in the early spring; only coming out to feed in the early morning, when the dew is on the lichens, or during rain.

The perfect insect appears in July and August, and may often be noticed in plenty, reposing during the daytime on the surface of the old walls, rocks, etc., which have been the feeding ground of the larvæ; it flies after dusk, and comes very freely to light.

The allied species *Bryophila glandifera* seems common in the west of England, though we never see it now near London; it is rather larger and more of a greenish tinge, and has a short black streak connecting the basal dark patch with the dark patch before the middle of the wing; this black streak is altogether wanting in *Bryophila perla.*

FAMILY III. BOMBYCOIDÆ.

DIPHTHERA ORION. THE SCARCE MARVEL-DU-JOUR.

This fine insect occurs in few localities, and used to be a great rarity; its head-quarters appear to be the New Forest, and the south of Sussex.

The expansion of the wings is barely 1¼ inch. The fore-wings are of a beautiful pale green, with three white streaks lengthwise, and with three transverse black bands. The head is of a pale green; the front of the collar is black, and the top of the collar pale green (a character by which this insect may be with certainty distinguished from another green Noctua, *Agriopis Aprilina*).

The hairy larva is reddish or yellowish-grey, with the back black, interrupted by large oval spots of a pale yellow. It feeds on oak in August and September.

The perfect insect appears in June; it is sometimes found sitting on the trunks of trees in the daytime, but is more frequently obtained at sugar.

FAMILY III. BOMBYCOIDÆ.

ACRONYCTA PSI. THE COMMON DAGGER.

Very abundant throughout the country.

The expansion of the wings is about an inch and a half. The fore-wings are grey, varied with dark, with four conspicuous black marks, one of which, near the anal angle, has been compared to a dagger or to the Greek letter ψ.

The larva is greyish-black, with a broad pale yellow line along the back; on the fifth segment is a big black hump, and on the twelfth segment is a smaller hump. It feeds on a great variety of plants from August to October.

The perfect insect begins to appear in June, and keeps out a long while; it may constantly be noticed sitting on walls, posts, trunks of trees, etc., in the daytime.

FAMILY IV. LEUCANIDÆ.

LEUCANIA CONIGERA. THE BROWN-LINE BRIGHT EYE.

(Plate VI., Fig. 4.)

This species is tolerably distributed throughout the country, and in many places is not uncommon; it seems, however, to show a preference for chalky or limestone localities.

The expansion of the wings is from 1¼ to 1½ inch. The fore-wings are reddish-ochreous, traversed by two dark brown lines, the first of which, sharply angulated, is before the middle, and the second beyond the middle is nearly parallel to the hind-margin; between hese are the orbicular and reniform stigmata, of a paler chreous, except the lower end of the reniform stigma, hich is distinctly white.

The larva is bright ochreous or of a brownish-grey int, marked with numerous pale and dark longitudinal nes. It feeds on various grasses in April and May.

The perfect insect appears in June and July, and flies eely amongst flowers at dusk, occasionally disporting self in the daytime. It comes readily to sugar and to ight.

FAMILY IV. LEUCANIDÆ.

LEUCANIA PALLENS. THE COMMON WAINSCOT.

This species is very common throughout the country.

The expansion of the wings is rather more than 1¼ inch. The fore-wings are of a pale ochreous (sometimes reddish-ochreous), with the veins paler; nearly in the centre of the wing is a small dark grey dot and two others (forming a triangle with it) are placed between it and the hind-margin. The hind-wings are whitish, or very pale grey, towards the hind-margin, shading paler towards the base.

The larva is of a greyish-ochreous, with whitish dorsal and subdorsal lines, the latter edged above with grey; below it are three stripes in the paler ground-colour, one brownish, one brown, and one greyish. It feeds on various grasses in early spring.

The perfect insect appears in the month of June, and continues to appear throughout July and August; from its pale colour it is a conspicuous insect when flying at dusk, and can often be collected very freely.

There are numerous other allied species, but the differences are too minute, and they are so little likely to attract the attention of beginners, that it is unnecessary to introduce any notice of them here.

FAMILY V. APAMIDÆ.

GORTYNA FLAVAGO. THE FROSTED ORANGE.

This pretty insect seems common, and pretty generally distributed throughout England, but scarcely reaches into Scotland; in Ireland it is common.

The expansion of the wings is about 1½ inch. The fore-wings are of a dark yellow, streaked and shaded with brown, with a brownish band not far from the base, and a broader one beyond the middle; the orbicular stigma forms a round pale yellow spot before the middle of the wing.

The larva is of a pale yellowish with the spots black, and with a greyish-brown plate on the back of the second nt. It feeds in June on the stems and roots of s plants, such as burdock, water-betony, thistles,

perfect insect appears towards the end of August September; it comes very freely to light, and ttracts attention by tapping at the windows to be

Family V. Apamidæ.

ÆCIA NICTITANS. THE GOLDEN EAR.

(Plate VI., Fig. 5.)

pretty species is commonly distributed through- e country, and extends its northward range far cotland; it is common in Ireland.

expansion of the wings is about 1¼ inch. The ings are reddish-brown, with numerous darker, transverse lines; the two stigmata are well d, generally both are of a bright orange, but mes the ear-shaped or reniform stigma instead g orange is white.

larva is dull brown, with a shining darker plate second segment, and some brown spots along the it feeds on the roots of various grasses in May.

perfect insect appears in July and August; it ten be met with on the wing at dusk, and it comes nally to sugar, but very freely to light.

Family V. Apamidæ.

LOPHASIA POLYODON. THE DARK ARCHES.

s large Noctua is very abundant throughout the y.

The expansion of the wings varies from 1¾ inch to 2 inches. The fore-wings are greyish-brown, with four transverse toothed paler lines, and with two conspicuous short black streaks from the base, and another below the centre of the wing; the intensity of the ground-colour varies exceedingly in different specimens.

The larva is of a dull livid greyish-brown, with the spots shining black; the second segment is black, as is also the anal segment. It feeds in the spring on the roots of various low plants; it is seldom seen, as it rarely comes above the surface of the earth.

The perfect insect appears in June and July, and is found abundantly on palings, walls, trunks of trees, etc., in the daytime, or flying after dusk; it comes freely to sugar and to light, and is often found in the interior of houses.

FAMILY V. APAMIDÆ.

HELIOPHOBUS POPULARIS. THE FEATHERED GOTHIC.

(Plate VI., Fig. 6.)

This fine insect is common in most parts of the south of England, but seems scarcer towards the north; it has occurred in the neighbourhood of Edinburgh; it is common in Ireland.

The expansion of the wings is rather more than 1½ inch. The fore-wings are of a dark brown, with the veins conspicuously whitish, and a whitish transverse line towards the hind margin; the stigmata form two pale spots near the middle of the wing.

The males have the antennæ beautifully pectinated, whence the name of the "Feathered Gothic."

The larva is of a metallic bronzy-brown, darker above, rith whitish lines; the second segment with a shining lack plate. It feeds on the roots of grass in the spring.

The perfect insect makes its appearance in August; comes very freely to light.

Family V. Apamidæ.

MAMESTRA BRASSICÆ. THE CABBAGE MOTH.

Abundant throughout the country.

The expansion of the wings is nearly 1¾ inch. The re-wings are dark grey, varied with black; before the nd-margin is an indented whitish line; a little be- nd the middle is a white spot, the reniform stigma ing margined and almost filled up with white.

The larva is variable in colour, either dark grey, eyish, or green, with the dorsal line darker, and a ite line on the sides. It feeds in the hearts of cab- ges, and is also very destructive to geraniums and er border plants, in the months of August and Sep- nber.

The perfect insect appears towards the end of May, d keeps coming out for some time; it may constantly seen on palings, trunks of trees, etc.; it comes freely sugar and to light.

Family V. Apamidæ.

MAMESTRA PERSICARIÆ. THE DOT.

(Plate VII., Fig. 1.)

This handsome moth is common, and generally distributed throughout the south of England, but does not seem to extend its range far towards the north; it would appear to be totally wanting in Scotland, if, indeed, it be found north of Manchester. In Ireland it has occurred near Dublin.

The expansion of the wings is about 1¼ inch. The fore-wings are blackish, in fine specimens with a beautiful purplish gloss, with faint indications of the darker transverse lines, and a few yellowish dots near the hind-margin indicate the position of the subterminal line; the orbicular stigma is of the same colour as the rest of the wing, almost black, but the reniform stigma is conspicuously white, with a brownish central line.

The larva is remarkably handsome, with a velvety appearance, it varies in colour, being sometimes pale green, sometimes reddish-grey; the dorsal line is whitish, and there are some half-lozenge-shaped darker markings along the back of the fifth to twelfth segments; this last is slightly humped; it feeds on various low plants in August and September, and is very common in gardens, on geraniums, convolvulus, etc. etc.

The perfect insect appears in June and July; it is sometimes found on palings, and occasionally comes to sugar and light.

FAMILY V. APAMIDÆ.

APAMEA BASILINEA. THE RUSTIC SHOULDER-KNOT.

This species is also very common and generally distributed.

The expansion of the wings is nearly 1½ inch. The fore-wings are of a greyish-ochreous, with a slight tinge of brownish; from the centre of the base is a very decided, short black streak; beyond the middle the margins of the reniform stigma form a whitish spot, the lower half of the stigma is, however, filled up with blackish.

The larva is brownish, with the dorsal and subdorsal lines ochreous, and a whitish line on the sides; the spots are black. It feeds in autumn on wheat, and may be seen by scores in places where wheat is being thrashed; in the early spring it feeds on various low plants.

The perfect insect appears in June, and may often be taken on the wing after dusk; it also comes freely to sugar and to light.

FAMILY V. APAMIDÆ.

APAMEA OCULEA. THE COMMON RUSTIC.

This is one of the most abundant of our *Noctuæ,* and seems very generally distributed throughout the country.

The expansion of the wings is nearly 1¼ inch. The fore-wings vary extremely in colour, and also in markings, so that formerly this one insect used to count in our collections as several distinct species. The prevailing colour is brown, sometimes pale brown, sometimes reddish-brown, and occasionally of a black-brown, —sometimes there is a darker shade along the costal portion of the wing, sometimes there is a darker central band; beyond the middle the reniform stigma forms a conspicuous pale spot, ochreous or whitish, sometimes actually white.

The larva is of a dull grey or greenish-white, with the subdorsal and spiracular lines dull reddish; it burrows down the stems of various grasses in the spring.

The perfect insect makes its appearance in July, and keeps out some time; it comes very freely to sugar, and also to light; in the daytime we often see it sitting on palings.

FAMILY V. APAMIDÆ.

MIANA LITEROSA. THE ROSY MINOR.

(Plate VII., Fig. 2.)

This elegant little *Noctua* seems pretty generally distributed throughout the country and moderately common.

The expansion of the wings is about 1 inch. The fore-wings are of a pale grey, varied with dark grey, and delicately tinged with rosy; the two stigmata are pale grey, the orbicular with a dark outline, the reniform only with a dark edge towards the base of the wing; beneath the reniform stigma is a large pale blotch reaching to the inner margin, preceded by a dark line, which is nearly straight.

The larva, which feeds in the stems of grasses in April, has been very little observed.

The perfect insect appears towards the middle of June and in July; it is sometimes found flying along hedges at dusk, and comes rather freely to sugar.

FAMILY VI. CARADRINIDÆ.

GRAMMESIA TRILINEA. THE TREBLE LINES.

A very common species, and very generally distributed in the southern and midland counties of England;

ard it occurs in Yorkshire and Lancashire; it is ot uncommon in Ireland.

expansion of the wings is 1½ inch. The fore- are of greyish-ochreous, with four transverse rownish lines, the first near the base and rather iated, the third in the centre of the wing, often r than the others.

ariety, of a darker ground-colour, occurs, in which cond and fourth lines are conspicuous from having nargins, but the third is almost obliterated in the ground-colour. To this variety the name of had been given.

short and thick larva is dark grey or dull reddish- with paler dorsal line, and subdorsal lines, and iracular line is darker brown; spots black, small; s on plantain in the autumn and spring, growing owly.

perfect insect appears towards the end of May, roughout the following month; it comes very to sugar, and may be found not uncommonly in grass fields.

Family VII. Noctuidæ.

TIS *EXCLAMATIONIS.* THE HEART AND DART.

ost abundant species throughout the country.

expansion of the wings is about 1½ inch. The ngs are of a pale-brown, more or less tinged with -grey; a little below the centre is an elongate, black spot (technically termed the claviform); beyond and above this are the two ordinary ta, the first often hardly distinguishable from the ground-colour of the wing, the second (or reniform stigma) is conspicuously darker; besides these markings there are two or three rather indented transverse lines. The hind-wings of the male are white, or only with the veins darker, those of the female are smoky grey.

The larva is dull grey, with the spots large and black, and a blackish plate on the second segment; it feeds in autumn on the roots of various plants, seldom appearing above the surface of the ground; in turnip-fields it is often extremely destructive, as many as twenty of these ugly larvæ being sometimes found at work on one turnip.

The perfect insect appears in June, and keeps out through July and August; from the white underwings of the male, it is a conspicuous object when flying along the hedgerows after dusk; it comes very freely both to sugar and to light.

The allied species *Agrotis segetum* (the Common Dart) is also very common; in it the claviform stigma is smaller and merely outlined, not filled up with brown-black as in *A. exclamationis*; and the hind-wings of the female are little darker than those of the male.

The habits of the two species seem precisely similar.

Family VII. Noctuidæ.

AGROTIS AGATHINA.

(Plate VII., Fig. 3.)

This pretty heath-feeding species is widely distributed, and has now occurred in many very different localities; some twenty years ago, it was looked upon rather as a prize.

The expansion of the wings is about 1¼ inch. The fore-wings are reddish-grey, with the transverse lines blackish; a rather broad, pale streak runs along the costa; immediately below this is a deep black, wedge-shaped mark, just before the orbicular stigma, and a square-shaped black spot occupies the space between the stigmata, so that the pale, reddish-grey, orbicular stigma is rendered remarkably conspicuous, being almost surrounded by black; towards the hind-margin are some elongate black dashes, before the subterminal line.

The larva is green or brown, mottled with velvety-black, with white dorsal and subdorsal lines, and a white ateral line; it feeds on the common heath (*Calluna vulgaris*), and may be taken very plentifully by sweeping the heather at dusk in April and May.

The perfect insect appears in August, when the heather is in blossom, and may be taken buzzing at the heath-blossoms after dusk; it comes also rather freely to sugar.

FAMILY VII. NOCTUIDÆ.

AGROTIS PORPHYREA. THE TRUE LOVER'S KNOT.

This pretty species is very common on heaths hroughout the country.

The expansion of the wings is about 1 inch. The ore-wings are of a dull, dark red, with two or three lackish, transverse lines, margined with pale grey, and everal short black streaks, longitudinally placed, especially on the fold; the stigmata form two pale spots, he anterior, or orbicular one is conspicuously white.

The larva is of a reddish-orange, with the spots white dged with blackish; it feeds on heath in the autumn.

The perfect insect appears in the months of June and July, and may often be met with flying in the daytime or towards dusk over the tops of the heather; it also comes freely to light and sugar.

FAMILY VII. NOCTUIDÆ.

TRIPHÆNA IANTHINA. THE LESSER BROAD-BORDERED YELLOW UNDERWING.

(Plate VII., Fig. 4.)

This handsome moth is common throughout the country.

The expansion of the wings is 1½ inch. The fore-wings are of a brownish ground-colour, elegantly tinged with reddish or violet; from the middle of the costa is a pale violet blotch, extending to and almost including the orbicular stigma; beyond the middle of the wing is a broad wavy pale band, followed by a dull, dark red, triangular spot on the costa, which precedes the sub-terminal line; the hind-wings are bright orange, clouded with black at the base, and with a broad, deep black band before the hind margin.

The larva is greyish ochreous, with a paler dorsal line, and with two conspicuous black spots on each of the ninth to twelfth segments; it feeds at night in early spring on the leaves of primrose, dock, and other low plants, hiding itself during the daytime near the roots of the plant.

The perfect insect appears about the middle of July and in August; it often flies very freely of its own accord, with a wild, dashing flight, in the afternoon and towards evening: it also flies after dark, and comes freely to sugar and to light.

FAMILY VII. NOCTUIDÆ.

TRIPHÆNA FIMBRIA. THE BROAD-BORDERED YELLOW UNDERWING.

This handsome insect is generally distributed throughout the country, and is moderately common in most localities.

The expansion of the wings is rather more than 2 inches. The fore-wings vary very much in intensity of colour, but have always more or less of an olive tinge; beyond the middle is generally a distinctly paler band, in which, on the costa, is a triangular darker spot; the hind-wings are of a deep orange, with a broad, deep black band (broadest towards the costa) towards the hind margin.

The larva is brown, with the dorsal line paler; in the place of the subdorsal line is a row of oblique, whitish stripes, alternating with some whiter spots; it feeds in the early spring on primrose, dock, and various other low plants; it is full-fed towards the end of April.

The perfect insect appears towards the end of June and beginning of July; it is most frequently obtained at sugar, but is not nearly so commonly met with as the larva.

FAMILY VII. NOCTUIDÆ.

TRIPHÆNA PRONUBA. THE COMMON YELLOW UNDERWING.

This fine, showy-looking insect is extremely plentiful throughout the country.

The expansion of the wings is about 2 inches. The fore-wings vary very much, both in the ground-colour and the intensity of marking; sometimes they are pale reddish-ochreous; sometimes dark reddish-brown, and all intermediate shades occur; the two stigmata are generally tolerably distinct; on the costa, a little before the tip, is a small black spot; the hind-wings are yellow, with a rather narrow black band before the hind margin.

The larva varies also in colour from dull-greenish to dull-grey, the dorsal and subdorsal lines rather paler; above the latter are some large blackish spots from the third to the eleventh segments; it feeds throughout the winter and early spring on all sorts of low plants, and is full-fed early in April.

The perfect insect appears in June and July, and is often very abundant in hay-fields; it flies very briskly if disturbed during the day, and then dashes again suddenly to the ground; and though so conspicuous when flying from the gay colour of the hind wings, its sombre demure look when at rest will often prevent the inexperienced collector from recognizing the insect of which he is in pursuit.

There are three other species of these Yellow Underwings, and two of them are tolerably common.

FAMILY VII. NOCTUIDÆ.

NOCTUA PLECTA. THE FLAME SHOULDER.

(Plate VII., Fig. 5.)

This pretty species is common, and generally distributed throughout the country.

The expansion of the wings is rather more than an inch. The fore-wings are reddish-brown, with a broad, whitish-ochreous streak along the costa to beyond the middle; below this is a slender, blackish streak, spring-ing from the middle of the base; the two stigmata are margined with white; the hind-wings are silky white.

The larva is of a dull reddish-brown, with a row of white dots along the subdorsal line; it feeds in the spring on various low plants.

The perfect insect appears in June, and may be found flying along hedges after dusk, being, from the pale hind-wings, very conspicuous; it also comes freely to sugar and to light.

FAMILY VIII. ORTHOSIDÆ.

TÆNIOCAMPA GOTHICA. THE HEBREW CHARACTER.

(Plate VII., Fig. 6.)

This species is very common, and generally distributed throughout the country.

The expansion of the wings is about 1¼ inch. The fore-wings are greyish-purple, sometimes very dark, sometimes pale; a little above the centre of the wing is a conspicuous black mark, something like a figure 7 or a prostrate L; technically speaking, it extends under the orbicular stigma, and then fills up the space between that and the reniform stigma; obliquely beyond it is a short black streak on the fold.

The larva is green, irrorated with yellowish dots; the dorsal and subdorsal lines are yellowish, and the spiracular line white; it feeds in June on various plants.

The perfect insect appears towards the end of March and beginning of April; it frequents the flowering sallow bushes at dusk, and may sometimes be collected in great plenty; it also comes to light.

FAMILY VIII. ORTHOSIDÆ.

ANCHOCELIS LUNOSA. THE LUNAR UNDERWING.

This is pretty generally distributed throughout the country, and in many places it is common.

The expansion of the wings is about 1¼ inch. The ground-colour of the fore-wings varies considerably: sometimes it is greyish-brown, sometimes reddish-ochreous; the veins are frequently paler; the two stigmata are a little darker than the ground-colour, and towards the hind-margin is a transverse row of blackish spots; the hind-wings are whitish, with a rather indistinct greyish band towards the hind margin, and with a darker grey central crescent-shaped spot.

The larva is of an olive-brown; the dorsal region darker, with fine ochreous dorsal and subdorsal lines; the spiracular line is dark; thoracic plate on the second segment pale-yellow, edged with black posteriorly: it feeds on grass, in the spring.

The perfect insect appears in the first half of September, and comes very freely to light.

FAMILY VIII. ORTHOSIDÆ.

SCOPELOSOMA SATELLITIA. THE SATELLITE.

This showy insect is plentiful throughout the country.

The expansion of the wings is about 1⅝ inch. The fore-wings are of a reddish-ochreous, shaded with brown; beyond the middle is a conspicuous white spot, with a minute white dot immediately below it and another immediately above it: sometimes the spot and the dots are deep ochreous instead of white.

The larva, which is one of those collectors should carefully avoid, is of a dark blackish-brown, with three white lines on the back of the second segment, and some white spots on the sides below the spiracular line. It feeds in May and June, on oak, beech, etc., and on all sorts of larvæ,—so that it is a most disagreeable inmate of a breeding cage.

The perfect insect appears in October, and lives through the winter, hybernated specimens being often found in the spring; it comes very freely to sugar, and in autumn may be found sucking the flowers of the ivy, and in spring the sallow-blossoms.

FAMILY VIII. ORTHOSIDÆ.

HOPORINA CROCEAGO. THE ORANGE UPPER-WING.

(Plate VIII., Fig. 1.)

This elegant species seems widely distributed in the south of England, occurring from Kent to Devonshire, but it does not seem to extend its northern range beyond Worcester. In Ireland it has been noticed in the county of Wicklow.

The expansion of the wings is about 1¼ inch. The fore-wings are pale orange, dotted with dark grey; the stigmata rather paler orange; a sharply angulated transverse grey line in the middle of the wing intersects the reniform stigma; the hind-wings are almost entirely white, with a narrow central greyish band.

The larva is dark-ochreous, tinged with orange, with a row of darker V-shaped marks along the back. It feeds on oak in May and June.

The perfect insect appears in October, and frequents ivy-bloom; it may occasionally be taken at sugar; it lives through the winter, and comes out from its hiding-quarters in the spring, when it may be occasionally found feasting on the blossoms of the sallows.

FAMILY VIII. ORTHOSIDÆ.

XANTHIA CERAGO. THE SALLOW.

This pretty insect is very generally distributed throughout the country, and is tolerably common in most localities.

The expansion of the wings is nearly 1½ inch. The fore-wings are of a pale yellow, with several purplish transverse lines and bands, which, however, are sometimes almost entirely obliterated; beyond the middle is a rather conspicuous dark-grey spot, being the lower half of the reniform stigma; the head and front of the thorax are pale yellow (in the rather closely allied *X. Flavago,* the Pink-barred Sallow, they are purplish); the hind-wings are white.

The larva is of a violet-brown, with the dorsal line bordered by two white lines, and the spiracular line greyish. It feeds in the catkins of the sallow when young, afterwards on various low plants.

The perfect insect appears in September, and may often be taken flying amongst sallow-bushes at dusk; it also comes to sugar and to light.

FAMILY IX. COSMIDÆ.

DICYCLA OO. THE HEART MOTH.

(Plate VIII., Fig. 2.)

This elegant species seems restricted in its range to the south of England, where it is perhaps most plentiful in the New Forest; it occurs at Stowmarket in Suffolk, and near Worcester.

The expansion of the wings is about 1¼ inch. The fore-wings are of a whitish-ochreous, marked with greyish-brown, there being a large blotch of the latter colour near the base, and a thickish line above and below the reniform stigma; all the three stigmata are conspicuously of the pale ground-colour with dark outlines; many of the veins are also greyish-brown; the hind-wings are whitish.

The larva is of a brownish-black, with the dorsal, subdorsal, and spiracular lines of a brilliant white. It feeds on oak in May.

The perfect insect appears in July, and may be occasionally met with at sugar.

FAMILY IX. COSMIDÆ.

COSMIA TRAPEZINA. THE DUN-BAR.

A very plentiful species, and generally distributed throughout the country.

The expansion of the wings is about 1¼ inch. The fore-wings vary a good deal in colour from greyish-ochreous to reddish-ochreous, with an ill-defined angulated darker band in the middle of the wing; before this is an oblique transverse dark line, edged internally with white, and beyond it an angulated transverse dark line, edged externally with white; these two lines are very much nearer together on the inner margin than they are on the costa.

The larva is greenish, with the dorsal, subdorsal, and spiracular lines white; the spots blackish-green. It feeds in May and June on oak, birch, etc., and should be carefully avoided by the collector, as it is extremely apt to devour other larvæ that happen to be domiciled with it.

The perfect insect appears in July and August, and is very frequently beaten from the branches of trees in the daytime; it comes freely to sugar.

FAMILY X. HADENIDÆ.

HECATERA SERENA. THE BROAD-BARRED WHITE.

(Plate VIII., Fig. 3.)

This is pretty generally distributed in the south of England, but is of rare occurrence in the north; in Ireland it has occurred at Howth and in the county of Wicklow.

The expansion of the wings is about 1¼ inch. The fore-wings are white, with a broad, blackish band across the centre, the two stigmata appearing as pale spots in this dark band; the hind-margin is clouded with pale grey.

The larva is grey, with a dorsal row of dark-grey spots; the incisions of the segments are whitish. It feeds on lettuce, sow-thistle and allied plants in August.

The perfect insect appears towards the end of June and beginning of July; it may sometimes be found on the trunks of trees or on palings, its contrast of colours making it very conspicuous. (The late Mr. J. F. Stephens records having once found several dozens on the trunk of a pollard ash; this was probably a case of "assembling," like those alluded to at page 54.) It also comes to sugar, and rather freely to light.

FAMILY IX. HADENIDÆ.

POLIA CHI. THE JULY CHI.

his species is common, and generally distributed in
cashire, Yorkshire, and further to the north, but is
om found in the southern portion of the islands.

he expansion of the wings is nearly 1½ inch. The
-wings are whitish-grey, with several darker, wavy,
sverse markings, and with the margins of the stig-
a darker; below the stigmata is a short, black streak,
ed at each end; a little before the hind-margin are
ral small wedge-shaped black spots.

he larva is green, with the subdorsal line whitish
the spiracular line yellowish. It feeds in May on
ice, sow-thistle, etc.

he perfect insect appears in August and September
may often be found in the daytime, reposing on
stone walls, which, in the northern counties, replace
hedges which enclose our fields in the south.

FAMILY X. HADENIDÆ.

GRIOPIS APRILINA. THE MARVEL-DU-JOUR.

his is common, and generally distributed through-
the country.

he expansion of the wings is between 1½ and 1¾
. The fore-wings are green, with a broadish black
sverse line in the middle, and several other slender
sverse black lines, more or less edged with whitish;
stigmata are also outlined with black; the head is
green, the front of the collar also pale green, the

top of the collar black (in *Diphthera Orion,* see p. 176,) it is exactly the reverse).

The larva is reddish-grey, with black streaks; the dorsal line is blackish; the spots are large and white. It feeds on oak in June.

The perfect insect appears in September, and may often be found in the daytime resting on the trunks of trees; at night it comes very freely to sugar.

FAMILY X. HADENIDÆ.

PHLOGOPHORA METICULOSA. THE ANGLE SHADES.

This handsome species is very abundant throughout the country.

The expansion of the wings is about 2 inches. The fore-wings are pale ochreous, with a faint rosy tinge; not far from the base is a large olive-brown patch on the inner margin: then follows an oblique, pale, transverse line, beyond which is a large triangular brown blotch (the apex on the inner margin), in this blotch the stigmata appear as two paler spots, and their margins meet at the lower end; the hind-margin is curiously scolloped.

The larva is greenish or brownish, with numerous pale dots; the dorsal line is white, slender, and interrupted; the spiracular line is pale. It feeds on all sorts of low plants throughout the winter and early spring, and also in June and July. This larva is extremely plentiful in greenhouses, where occasionally it does much havoc.

The perfect insect appears in June and September; it comes very freely to sugar, and sometimes to light; sometimes it may be noticed at rest on palings. When in repose, the wings are folded in a very peculiar way, so as to give the insect an elongate, narrow appearance.

FAMILY X. HADENIDÆ.

PHLOGOPHORA EMPYREA.

(Plate VIII., Fig. 4.)

This handsome and showy species was only added to the British list a few years ago; it occurs in various localities in Sussex, most freely in the neighbourhood of Lewes.

The expansion of the wings is very nearly 2 inches. The fore-wings are of a rich, purplish-brown, with a conspicuous dark-blackish blotch near the inner margin at the base, and another in the centre of the wing below the stigmata; there is also a smaller black blotch on each side of the reniform stigma, which is conspicuously pale-yellowish, with an elongate, narrow projection from its lower end towards the base of the wing.

The larva is greyish-green or greyish-brown, with the dorsal and subdorsal lines paler and with a row of darker lozenge-shaped blotches along the back; the pots are yellowish-white. It feeds in the early spring on various low plants, being rather partial to pilewort.

The perfect insect appears towards the end of September and beginning of October, and comes rather readily to sugar.

FAMILY X. HADENIDÆ.

HADENA OLERACEA. THE BRIGHT-LINE BROWN-EYE.

A common species, and very generally distributed.

The expansion of the wings is about 1¼ inch. The fore-wings are of a dull, dark red; beyond the middle is a small, deep, orange spot (being the reniform stigma); towards the hind-margin is a whitish transverse line.

The larva is ochreous-brown, dotted with white; the dorsal line is brown, the subdorsal line pale; the spiracular line is bright-yellow, edged above with blackish. It feeds in August and September on various low plants.

The perfect insect appears in June, and may be met with flying after dusk; it comes freely both to sugar and light.

FAMILY X. HADENIDÆ.

HADENA PISI. THE BROOM-MOTH.

This species seems very generally distributed, and is usually common; in the south of Ireland, near Killarney, the larva occurred by thousands in boggy places in July, 1865.

The expansion of the wings is about 1½ inch. The fore-wings are of a pale reddish-brown, marbled with darker, with no conspicuous markings except a rather indented pale-yellowish transverse line a little before the hind-margin; the lower end of this line is broadest, and it turns abruptly towards the anal angle.

The larva varies in the ground-colour from dark green to reddish-brown, but the subdorsal and spiracular lines are conspicuously pale yellow, so that it is always a handsome larva. It feeds on broom and various low plants in August and September. The swarms of larvæ in Ireland were feeding on *Myrica Gale* (bog myrtle), and all sorts of bog plants.

The perfect insect appears in June, and may be btained flying after dusk; it comes readily to sugar.

Family X. Hadenidæ.

HADENA RECTILINEA. THE CLOUDED BROCADE.

(Plate VIII., Fig. 5.)

This handsome Noctua is not rare in the neighbour- oods of Sheffield and Huddersfield, and occurs in rious localities in Scotland; in Ireland it occurs near illarney.

The expansion of the wings is about 1½ inch. The e-wings are pale grey, with a very broad, dark, ldish-brown band in the middle, and a smaller dark ldish blotch near the base towards the inner margin; form of the orbicular stigma is unusual,—instead of ng really *orbicular* it is narrow and elongate; at the ter edge of the broad dark band is a whitish streak r the anal angle.

The larva is velvety-looking, rich brown on the back, h paler wedge-shaped marks on each side; the elfth segment is slightly humped. It feeds on sallow, berry, etc., in September and October.

The perfect insect appears in June, and comes freely sugar in the localities where it occurs.

Family XI. Xylinidæ.

ALOCAMPA VETUSTA. THE RED SWORD GRASS.

This fine species seems very widely distributed throughout the country, occurring throughout Scotland and also in Ireland.

The expansion of the wings is from 2 to 2¼ inches. The fore-wings are ochreous, with a broad, deep, reddish-brown stripe along the inner margin, and reaching to the stigmata; of these the orbicular stigma is indistinct and obliquely placed; the reniform stigma is much more distinct and perpendicularly placed, and a black dash runs from it to the subterminal line.

The remarkably handsome larva is of a dark green, with pale yellow subdorsal lines; the slender spiracular line is yellow, edged with black; the spiracles are yellow, and the spots white, edged with black. It feeds in May and June, on various meadow-plants and marsh-plants.

The perfect insect appears in September and October, and comes freely to sugar; it lives through the winter, and is sometimes found at sallow-blossoms in March and April.

The allied Sword-Grass Moth (*C. exoleta*) is much commoner, but not nearly so handsome, as *C. vetusta*; its habits are very similar, and its larva is the more beautiful of the two.

FAMILY XI. XYLINIDÆ.

CUCULLIA VERBASCI. THE MULLEIN SHARK.

This handsome species is pretty generally distributed in the south of England, but seems rather partial to chalk or limestone localities; it does not occur in Scotland, but is common in Ireland in the counties of Dublin and Wicklow.

The expansion of the wings is about 1¾ inch. The fore-wings are of a greyish ochreous, a little paler beyond the middle, with a reddish-brown stripe along the costa, not sharply defined, and another along the inner margin more sharply expressed; it is intersected near the middle by two whitish crescents forming a W-like mark; the hind-wings are whitish-ochreous at the base, shading into greyish fuscous at the hind-margin, and with the veins fuscous; in the female the hind-wings are almost entirely greyish-fuscous.

The conspicuous and handsome larva is greenish-white, with a broad, bright yellow transverse band on each segment, and with numerous large black spots. It feeds on mullein (*Verbascum*) and water betony (*Scrophularia*), in the months of June, July, and August, sitting perfectly exposed on the upper surface of the leaves during the day, so that it is most easily collected.

The perfect insect appears at the end of April and beginning of May; I believe it is not often met with at large; collectors generally breed it from the larvæ, which are so readily seen.

There are other allied species of Shark Moths, with conspicuous day-exposed larvæ, but the Common Shark (*C. umbratica*) has a very different habit; of that, the perfect insect may constantly be seen buzzing Sphinx-like at flowers in the evenings of June and July, or it may be found at rest on palings, and not unfrequently it comes to light; but the larva is always concealed during the day and only comes out to feed at night; hence very few entomologists have had the pleasure of seeing the larva of the Common Shark, which is remarkably handsome, of a bright ochreous-yellow, curiously marbled with blackish-brown on the back. It feeds on sow-thistle, in July and August.

Family XII. Heliothidæ.

HELIOTHIS MARGINATA. THE BORDERED SALLOW.

(Plate VIII., Fig. 6.)

This handsome species seems tolerably common in several parts of the country, and though most of the localities given for it are in the south of England, yet it occurs at least as far north as Birkenhead.

The expansion of the wings is about 1¼ inch. The fore-wings are of a pale brownish-ochreous, darker, and with a purple tinge, towards the hind-margin; the transverse lines and veins, and the outlines of the stigmata, are distinctly darker than the ground-colour; the hind-wings are whitish-ochreous, with a broad, blackish border and central lunule; the veins are also blackish, and the base is sometimes suffused with blackish.

The larva varies much in colour, the usual form is pale green, dotted with white; the dorsal line is of a bluish-green, the subdorsal lines are slender and white, and the spiracular line yellow. It feeds quite exposed on restharrow in August.

The perfect insects make their appearance towards the end of May and during June, and may be occasionally met with flying over flowers; they come to sugar occasionally.

To the same family belongs the pretty heath-frequenting *Anarta Myrtilli* (the Beautiful Yellow Underwing), which darts about vigorously during the hottest sunshine; the smaller *Heliodes Arbuti* flies more sluggishly in meadows.

FAMILY XVII. PLUSIDÆ.

PLUSIA GAMMA. THE SILVER Y.

A pretty species, abundant throughout the country.

The expansion of the wings is about 1½ inch. The fore-wings are of a violet-grey, clouded with darker grey, here and there extremely glossy, some of the transverse lines, and the outline of reniform stigma, with a faint silvery lustre; just beneath the orbicular stigma is a more distinct silvery mark in the form of the letter *y*, or of the Greek letter γ (whence the name).

The larva (half-looping because only twelve-legged) is green, with the spots whitish; the dorsal line bluish-green, slenderly edged with whitish; spiracular line yellowish, bordered above with darker green. It feeds on all sorts of low plants in the spring, summer, and autumn, and is very plentiful in gardens.

The perfect insect appears from June to October continuously, seeming most plentiful just before the flowers in our gardens are cut off by the first sharp night; it flies, as already remarked (p. 24), at all hours of the day and night.

FAMILY XXIII. CATOCALIDÆ.

CATOCALA NUPTA. THE RED UNDERWING.

This handsome insect used to be generally common in the south of England, though of late years it appears to have become scarcer; Worcester appears to indicate the extent of its northward range.

The expansion of the wings is about 3 inches. The fore-wings are grey, with the transverse lines and the reniform stigma darker grey, the latter is preceded by a pale ochreous-grey blotch ; the orbicular stigma seems entirely suppressed ; the hind-wings are red, with a broad deep black border before the white cilia, and with a broad, though much indented, central black band.

The larva elongate and flattened, with fleshy filaments on the sides ; above the legs is greenish-grey, with a double wavy whitish line along the back ; the subdorsal line is whitish, and there are slight rosy humps across the back of the fifth to twelfth segments. It feeds in May and June on willows and poplars.

The perfect insect appears at the end of July and in August, and may sometimes be noticed at rest on palings or trunks of trees ; occasionally we see it sporting on the wing in the daytime, when it is extremely showy from the contrast of black and white on the under-side of the fore-wings.

GEOMETRINA. FAMILY I. OURAPTERYDÆ.

OURAPTERYX SAMBUCARIA. THE SWALLOW-TAIL MOTH.

This conspicuous insect is common generally in the south of England, but seems scarcer as we advance northward ; in Ireland it is common, but has not been noticed in Scotland.

The expansion of the wings is about 2 inches. All the wings are of a pale sulphur, with numerous, short, slender, transverse, pale olive streaks ; the fore-wings are traversed by two dull olive streaks, the first of which is also continued across the hind-wings ; these have in the middle of the hind-margin a tail-like projection, above which is a small red spot, edged with dark grey.

The larva is yellowish or reddish-brown, with paler ngitudinal streaks; the fourth segment is rather umped, and the seventh has a lateral protuberance; e ninth and twelfth segments are also slightly umped; two points project from the anal segment. It eds on various plants such as oak, elder, bramble, ivy, lematis, etc., in the autumn, and hybernating nearly ull-fed feeds up in the spring.

The perfect insect appears in July, and flies swiftly and wildly along hedges towards dusk; it comes occasionally to light.

FAMILY II. ENNOMIDÆ.

RUMIA CRATÆGATA. THE BRIMSTONE MOTH.

(Plate IX., Fig. 1.)

This pretty species is extremely plentiful throughout he country, enlivening many a lane by its merry gambols on a summer evening.

The expansion of the wings is about 1½ inch. All he wings are of a bright brimstone colour, with several aint leaden-coloured spots, placed in transverse rows; long the costa of the fore-wings are three brick-red pots, one at the base, one at the tip, and one in the iddle; from the latter hangs a small whitish spot, dged with dark brown.

The larva varies much in colour, being sometimes reen, sometimes brown, with a straight projection on he back of the seventh segment, and two small prominences on the ninth segment; the ninth segment ears a pair of prolegs, and the eighth segment also an ill-developed pair, so that the larva has in all fourteen legs. It feeds on hawthorn from June to October.

The perfect insect appears in May (or at the end of April if the weather be warm), and continues to be met with during the greater part of the summer; it often enters houses attracted by light.

FAMILY II. ENNOMIDÆ.

SELENIA ILLUSTRARIA. THE PURPLE THORN.

(Plate IX., Fig. 2.)

This handsome insect appears to be restricted in its range to the south of England.

The expansion of the wings varies from 1½ to 1¾ inch. All the wings are pale grey, with a faint rosy tinge clouded with brownish to beyond the middle; this darker colour is bounded in the fore-wings by a sinuous dark line, beyond which is a broad pale band, but this pale band is not nearly so distinctly expressed on the hind-wings; in the centre of each wing is a moon-shaped white spot.

The larva is of a rich purple-brown, varied with greyish and orange-brown, with bifid humps on the fifth, sixth, eighth, and ninth segments. It feeds on birch, beech, ash, oak, and sallow, in June and again in September.

The perfect insect appears in May and again in August; it comes rather freely to light. The May specimens are much larger than the August specimens, and this peculiarity of a striking difference of size in the two broods also occurs in another species of *Selenia*, the Early Thorn (*S. illumaria*), which appears in March and July, and is the commonest of the genus and generally distributed.

FAMILY II. ENNOMIDÆ.

ENNOMOS TILIARIA. THE CANARY-SHOULDERED THORN.

(Plate IX., Fig. 3.)

This fine insect is by no means uncommon in the south of England, and occurs northward as far as Darlington; it has not been observed in Scotland, but has been noticed in Ireland.

The expansion of the wings is about 1½ inch. The fore-wings are deep yellow, dusted with fuscous, with two dark fuscous transverse lines and a dark fuscous central spot; the hind-wings are duller, dusted with fuscous, with a central transverse line; the conspicuous feature of the insect is the canary-coloured downy-looking thorax.

The larva is brown, with dark brown lozenge-outlines on the back; the sides delicately mottled with grey and pink; with humps on the sixth and ninth segments. It feeds on sallow, birch, oak, etc., in June and July.

The perfect insect appears at the end of August and beginning of September; it comes very freely to light, as do also the other species of Yellow Thorns, which are likewise on the wing in August and September.

FAMILY III. AMPHIDASIDÆ.

NYSSIA ZONARIA. THE BELTED BEAUTY.

(Plate IX., Fig. 4, ♂ and ♀.)

This insect seems with us almost confined to the sand-hills of the Cheshire coast, near the mouth of the Mersey; but I strongly suspect that it must occur in similar localities in other parts of the country. Mr. Birchall turned out a colony of larvæ at Malahide, in Ireland, where the species continues to breed.

The expansion of the wings is about an inch in the male; the female has scarcely perceptible rudiments of wings. The fore-wings are whitish, with dark fuscous veins, and with an oblique, dark fuscous streak of irregular width from near the base of the inner margin to the costa beyond the middle; it is followed by a pale band and then by a dark band, and a slender pale band precedes the fuscous hind-margin. The thorax of the male has rather a downy look; it is pale grey, varied with dark fuscous; the abdomen in both sexes is blackish, with narrow greyish-ochreous belts.

The larva is grey, dotted with black along the back, with a broad, lateral, bright yellow stripe. It feeds in May and June on yarrow and on various grasses.

The perfect insect makes its appearance from the end of February to the end of March, and may be found sitting on the grass on the sand-hills, where the species occurs.

FAMILY III. AMPHIDASIDÆ.

AMPHIDASIS PRODROMARIA. THE OAK BEAUTY.

This handsome species seems generally distributed throughout England, occurring as far north as the Cumberland Lake district, but I believe it has not yet been observed north of the Tweed; in Ireland it occurs in the county of Wicklow.

The expansion of the wings (both sexes are winged) is from 1¾ to 2 inches. The fore-wings are whitish, dusted with a black, with a broad reddish-brown band near the base, edged externally with black; in the middle is sometimes a shady blackish fascia, followed by a central black spot; beyond the middle is another reddish-brown band, edged internally with black; hind-wings paler with faint markings.

The larva is reddish-brown, more or less suffused with ashy, with dark brown chain-like markings on the back; on the fifth segment are two small lateral tubercles, and the twelfth segment bears two dorsal tubercles. It feeds on oak, birch, elm, and plum, in May and June.

The perfect insect appears towards the end of March and beginning of April; it generally emerges from the pupa in the afternoon, and may then be found sitting on the trunks of trees; it flies at dusk, and comes occasionally to light.

The allied species *A. betularia*, the Peppered Moth, is very common and more generally distributed throughout the country.

FAMILY IV. BOARMIDÆ.

HEMEROPHILA ABRUPTARIA. THE WAVED UMBRE.

(Plate IX., Fig. 5.)

This pretty species is generally common in the south of England, but appears to be less common in the north; in Scotland it has not been observed; in Ireland it occurs in the county of Wicklow.

The expansion of the wings is about 1½ inch. All the wings are ochreous, with brown or blackish markings, of which a dark blotch on the fore-wings from the hind-margin, below the apex, reaching nearly to the centre of the wing, and a dark band below the middle of the hind-wings are the most conspicuous.

The larva is blackish-brown, marbled with ochreous on the back; the sides are much wrinkled; there are two minute humps on the back of the ninth and tenth segments. It feeds on lilac and privet in July and August.

The perfect insect appears at the end of April and during May, and we often see it sitting with all its wings spread out on palings; it may also be met with flying in the evening, and it comes not unfrequently to light.

FAMILY IV. BOARMIDÆ.

CLEORA LICHENARIA.

This pretty species is common and generally distributed throughout England and Ireland, and has been noticed in more than one locality in the west of Scotland.

The expansion of the wings is from 1 to 1¼ inch. The fore-wings are whitish, much dusted with greenish-grey, with a central black spot and two transverse black lines, the first, not far from the base, rather regularly curved, preceded by a slender whitish band; the second, which is angulated and much indented, lies beyond the middle of the wing, and is followed by some pale blotches.

The larva is pale green, sometimes almost whitish-green, sometimes more yellowish-green; there are two small humps on each of the fifth to twelfth segments and between the humps there is frequently a black spot the spiracular line is wavy, blackish. It feeds in the autumn and early spring on the lichens growing on the trunks of various trees.

The perfect insect appears in July, and may sometimes be observed sitting on the trunks of trees, though not easily distinguished from the lichen-covered bark; it comes occasionally to light, and is sometimes met with on the wing at dusk.

FAMILY IV. BOARMIDÆ.

BOARMIA REPANDATA. THE MOTTLED BEAUTY.

This handsome insect is common, and generally distributed throughout the country.

The expansion of the wings varies from 1½ to 1¾ inch. All the wings are of a pale grey, dusted with brownish, with some wavy transverse lines; the fore-wings have a dark central blotch, and the second dark transverse line, not unlike an expanded W, terminates on the inner margin *beyond* the middle; between this and the hind-margin is a slender, wavy, pale band, which is also continued along the hind-wings.

The larva is ochreous-grey, spotted with black, with whitish ochreous dorsal and spiracular lines. It feeds on birch, sloe, spindle, bramble, etc., in April and May.

The perfect insect appears towards the middle of June and in July, and is often seen sitting on the trunks of trees in woods; it may also be met with flying at dusk, and comes occasionally to light.

FAMILY VI. GEOMETRIDÆ.

PSEUDOTERPNA CYTISARIA. THE GRASS EMERALD.

(Plate X., Fig. 1.)

This insect is common, and generally distributed throughout England and Ireland, and also occurs in the west of Scotland.

The expansion of the wings is about 1¼ inch. The fore-wings are greenish-grey, with two transverse darker lines, rather faintly indicated, and sometimes the intervening space is a little darkened; towards the costa is a small, dark, central spot; towards the hind-margin is a wavy pale band; the hind-wings are rather paler, with faint indications of a transverse dark line and pale band.

The larva is dark green, with the dorsal line darker, and the subdorsal lines paler; the spiracular line is pinkish-white, and has a branch from it running down the third pair of legs; the head is bifid, and the front edge of the second segment is also bifid, with the tips dark red. It feeds on broom and *Genista Anglica* in May and June.

The perfect insect appears in July, and is readily started up as we walk along on the heathy places where it occurs; it flies freely at dusk, and occasionally comes to light.

FAMILY VI. GEOMETRIDÆ.

PHORODESMA BAJULARIA. THE BLOTCHED EMERALD.

This delicately pretty species seems confined to the south of England, and nowhere very common; it frequents borders of woods.

The expansion of the wings is about 1¼ inch. All the wings are green, each with a whitish blotch, partially filled up with dull red at the anal angle; the fore-wings are traversed by two rather faint whitish lines, and on the hind-margin of the hind-wings are a few small whitish blotches.

The larva is reddish-brown, with the dorsal and subdorsal lines fuscous; on each of the fifth to ninth segments is a pair of dark brown papillæ, one outside each subdorsal line, furnished with a single hooked bristle; the use of these hooked bristles is very peculiar, and has been well described by the Rev. E. Horton, in the pages of the 'Entomologist's Monthly Magazine' (vol. ii. pp, 91, 92); these larvæ clothes themselves with vegetable fragments, and attach the brown scales of oak-buds and other objects to these papillæ. Mr. Horton remarks, "Until I had ascertained, by watching a young larva emerge from the egg, that it came out naked, I could scarcely believe that these ornaments were not part of tself, as every individual was so adorned, though apparently only just hatched. The one of whose exclusion from the egg I was an eye-witness, was immediately removed to a separate box, and supplied with a petal of a rose, from which, in a few minutes, it made up nine rosy 'favours,' and fastened them, with perfect regularity, upon its back; it then was placed with other larvæ of the same species, and soon joined them in gnawing away at the oak-leaves." The Rev. J. Hellins has observed that on two larvæ being hatched in one pill-box, where no food was at hand, one killed the other and stuck his carcase on his own back, so great was the innate desire for dress! (E. M. M. vol. ii. p. 114.) They feed slowly during the autumn, and in April commence attacking the unexpanded buds of the oak; they are full-fed in May.

The perfect insect appears towards the middle and end of June, and may be met with flying at dusk; comes occasionally to light.

Family VII. Ephyridæ.

EPHYRA OMICRONARIA. THE MOCHA.

(Plate X., Fig. 2.)

This neatly marked insect is not uncommon, and pretty, generally distributed in the south of England; but in the northern counties appears to occur but seldom; it has not yet been observed in Scotland, or in Ireland.

The expansion of the wings is nearly an inch. All the wings are of a whitish straw-colour, with a distinct dark grey band beyond the middle, the outer edge of which is much notched; beyond this band is a fainter and more slender one, with smoother outline; in the centre of each wing is a small whitish spot edged with grey.

The larva is velvety green, with pale yellow dorsal and subdorsal lines; the spots are black. It feeds on maple in June and September.

The perfect insect appears in the months of May and August, and may be often started from the bushes amongst which it is reposing, during the daytime sometimes we see it sitting on palings; it comes occasionally to light.

Family VIII. Acidalidæ.

ASTHENA LUTEATA. THE SMALL YELLOW WAVE.

(Plate X., Fig. 3.)

This pretty little species seems to be common, an generally distributed throughout England, but does n ppear to have been recorded as occurring in Scotland r Ireland.

The expansion of the wings is about ¾ inch. All the wings are pale yellow, with several wavy, transverse, darker yellow lines; in the centre of each wing is a small black spot.

The larva has not yet been observed.

The perfect insect appears in June, and frequents open places, in woods, and the borders of thickets.

FAMILY VIII. ACIDALIDÆ.

ACIDALIA RUSTICATA. THE LEAST CARPET.

This neatly marked little insect does not appear very generally distributed; it has occurred in the Isle of Portland, and near Gravesend, and in various localities round London; I have myself taken it at Lewisham.

The expansion of the wings is rather under ¾ inch. The fore-wings are whitish, with a greyish-brown blotch at the base of the costa, and broad greyish-brown central bands, in which is the black central spot; beyond this is a faint grey band, rather interrupted; the hind-wings have similar markings, but not so distinct, only they have no basal blotch.

The larva is dingy brown, with paler dorsal and subdorsal lines, and with a row of acorn-shaped pale spots on the back of the fifth to ninth segments; skin remarkably rough, clothed with clubbed bristles. It feeds on lilac, ivy, bramble, hawthorn, in the autumn and spring, being full fed about the end of May.

The perfect insect appears in July, and is sometimes noticed sitting in the leaves of plants; the contrast of colours rendering it rather conspicuous.

FAMILY VIII. ACIDALIDÆ.

ACIDALIA ORNATA. THE LACE BORDER.

(Plate X., Fig. 4.)

This very pretty species is not at all uncommon on the slopes of Box Hill, and on the woody bank on the north side of Headley Lane, and, I fancy, it must occur in similar chalky localities in other parts of the south of England.

The expansion of the wings is about an inch. All the wings of a pearly white, with a few faint, wavy, transverse lines; beyond the middle is a more distinct, almost black, wavy, transverse line, followed by two dark tawny blotches on each wing, one a little below the costa, the other on the inner margin, beyond these the wings are clouded with pale grey, intersected by a single wavy white line towards the hind-margin; the black central spot is distinct in the hind-wings, but scarcely visible in the fore-wings.

The larva is brownish-ochreous, with a pale grey dorsal line, and dark brown subdorsal lines, most distinct towards the head; on each of the fifth to ninth segments are two obtuse, dark, V-like markings; the spiracular line is pale ochreous, freckled and edged with brownish. It feeds on marjoram, thyme, and mint, in the autumn and spring.

The perfect insect makes its appearance at the end of June and beginning of July; it is easily started from its repose in the daytime, and flies, of its own accord, towards dusk.

FAMILY VIII. ACIDALIDÆ.

BRADYEPETES AMATARIA. THE BLOOD-VEIN.

(Plate X., Fig. 5.)

This pretty species is widely and generally distributed in England, and by no means uncommon; it occurs also in Ireland; but, I believe, has not been noticed in Scotland.

The expansion of the wings is about 1¼ inch. All the wings are whitish-grey, dusted with grey, with a dull, dark red line from the apex to the middle of the inner margin of the fore-wings, continued across the middle of the hind-wings; beyond this line the ground-colour is generally rather darker and is intersected by a slender, wavy, transverse line, which also starts from the apex of the fore-wings; along the hind-margin, which is often suffused with rosy, is a slender deep red line; cilia paler red.

The larva has the fifth segment much swollen; it is grey, with the dorsal line, and the subdorsal lines, which are rather interrupted, whitish; on the fifth to ninth segments are oblique white streaks from the dorsal to the subdorsal lines. It feeds on dock and various species of *Polygonum,* in August and September.

The perfect insect appears in June and July, and is partial to wet places; we are almost sure to dislodge it from the herbage on the sides of ditches, and sometimes we may see it sitting with its wings expanded on a leaf of meadow-sweet (*Spiræa ulmaria*).

FAMILY IX. CABERIDÆ.

ALEUCIS PICTARIA. THE GREY CARPET.

This dull-looking insect has not been noticed in many localities; Kent, Sussex, Essex, and Suffolk being the counties it specially patronizes, and probably nine-tenths of the specimens in our collections have been taken at Dartford Heath.

The expansion of the wings is about an inch.

The fore-wings are dark grey, with two rather wavy, darker transverse lines, and a darker central spot; along the hind margin is a row of black dots; the hind-wings are paler grey, intersected by a single wavy, darker line, and with a row of dark grey spots along the hind-margin.

The larva is brownish-grey, more or less marbled with whitish, particularly on the eighth and ninth segments; on the back of each of the fifth to eighth segments is a faint, blackish V-like mark, and on the twelfth segment is a black transverse line; on the third and fourth segments there are short, oblique, lateral, black streaks; there is a black spot on the side of each of the sixth to ninth segments above the whitish spiracles. It feeds on sloe in June, preferring the leaves of stunted sloe-bushes.

The perfect insect appears in April, about the time that the sloe is in blossom; and the stunted sloe-bushes on exposed heathy situations should then be searched at dusk with a lantern by those desirous of obtaining this insect, which, a few years ago, was esteemed a great rarity.

FAMILY X. MACARIDÆ.

MACARIA LITURATA. THE TAWNY-BARRED ANGLE.

(Plate X., Fig. 6.)

This neatly-coloured species is of general occurrence throughout the country, frequenting fir-woods.

The expansion of the wings is about 1¼ inch. The fore-wings are pale purplish-grey, with three darker transverse lines at nearly equal distances; the last of these is followed by a yellowish band, edged towards the costa with tawny; the hind-wings are much paler, with no very distinct markings; there are faint appearances of two transverse lines, and a still fainter indication of a yellowish band towards the hind margin.

The larva is green, with the dorsal and subdorsal lines whitish, and the spiracular line white. It feeds on fir in September.

The perfect insect appears in July, and may often be noticed at rest on the trunks of trees in fir-woods; it comes occasionally to light.

FAMILY XI. FIDONIDÆ.

STRENIA CLATHRATA. THE LATTICED HEATH.

This species is pretty common, and generally distributed throughout England and Ireland; but I do not think it it has yet been noticed in Scotland.

The expansion of the wings is about an inch. The fore-wings are of a pale whitish-ochreous, powdered

with grey, with the veins and four transverse bands dark reddish-grey; the three posterior of these are also continued across the similarly marked hind-wings; the cilia are prettily chequered whitish-ochreous and dark reddish-grey.

The larva is pale green, with two white dorsal lines, edged with darker green; the subdorsal lines and spiracular also white. It feeds in September on clover and other papilionaceous plants.

The perfect insect appears in May and June, and is very common in clover fields, flying by day; it sits with its wings partially erect.

FAMILY XI. FIDONIDÆ.

LOZOGRAMMA PETRARIA. THE BROWN SILVER LINE.

(Plate X., Fig. 7.)

This species is common, and pretty generally distributed throughout England, and has been noticed in Ireland in the county of Wicklow; I am not aware that it has been observed in Scotland.

The expansion of the wings is about 1¼ inch. The fore-wings are pale brown, with two oblique dark brown transverse lines, edged externally with pale; the second of these lines is considerably thickened towards the inner margin, and its pale edging is almost whitish; between them is a dark brown central spot; towards the hind-margin is a pale, wavy, transverse line; the hind-wings are very much paler, with a darker transverse line beyond the middle.

The larva is olive-green, with numerous slender chocolate-brown longitudinal lines; spiracular line creamy white, the spiracles black. It feeds on the common fern in June and July.

The perfect insect appears in May, and is readily started from its repose as we walk along; it flies briskly for a short distance, and abruptly settles again.

FAMILY XI. FIDONIDÆ.

FIDONIA PINIARIA. THE BORDERED WHITE.

This pretty species is very common in fir-woods throughout England and Scotland; but must be scarcer in Ireland, since Mr. Birchall has not himself met with it there.

The expansion of the wings is about 1¼ inch. The two sexes are very different in colouring; in the males the fore-wings are yellowish-white or white (specimens from the south of England are yellowish-white, whilst the Scotch specimens are white); a brown streak runs along the costa, and another along the inner margin, and the entire tip of the wing is of a brown-black; two or three brown veins intersect the pale portion of the wing; the hind-wings have very similar markings, but are more suffused; all the cilia are white, chequered with brown. In the English females all the wings are dull orange, freckled with brown, and with a broad brown border along the hinder margin, broadest towards the costa, and with one or two rather indistinct brownish bands; the Scotch females are much more sombre-looking, the orange colouring being replaced by a pale shade of dull brown.

The larva is whitish-green, with a rather broad, white, dorsal line; the subdorsal lines are pale bluish-white; the spiracular line is yellow, the spiracles orange. It feeds on the leaves of the fir in August and September.

The perfect insect appears towards the middle of May and June, and flies in fir-woods in the daytime; the males may often be observed sporting about in considerable numbers, sometimes unpleasantly above our reach; the female is less frequently met with, and, from her more obscure colouring, is very apt to escape observation, when at rest on the trunk of a fir-tree.

FAMILY XI. FIDONIDÆ.

FIDONIA LIMBARIA. THE FROSTED YELLOW.

(Plate XI., Fig. 1.)

This pretty broom-feeding species seems very local; it was first only known to us as a Scotch inhabitant of these islands, occurring at Dunkeld and at the Bridge of Earn; latterly, it has been met with in some plenty at Stowmarket, in Suffolk.

The expansion of the wings is about an inch. The fore-wings are deep yellow, speckled with blackish, with a blackish streak along the costa, and deep black hind-margin; the hind-wings have the ground-colour much more suffused with blackish, but the hind-margin is not nearly so dark.

The larva is dull greenish, with a blackish dorsal line and black subdorsal lines; the spiracular line is conspicuously yellowish. It feeds on broom in the months of August and September.

The perfect insect appears in June, and flies by day amongst its food-plant. I have never had the pleasure of taking this pretty species.

FAMILY XI. FIDONIDÆ.

STERRHA SACRARIA.

(Plate XI., Fig. 2.)

This recent addition to our lists has already occurred in a variety of localities in the south of England; thus in Kent, Surrey, Sussex, the Isle of Wight, Somersetshire, and Devonshire; one bold individual has been captured north of the Thames, in the Metropolitan suburb St. John's Wood. Mr. Birchall records the occurrence of this species in Ireland, at Killarney.

The expansion of the wings is nearly an inch. The fore-wings are of a pale straw-yellow, with a short dull red streak along the costa at the base, and an oblique red streak from the tip of the wing to the middle of the inner margin; the hind-wings are almost white, without markings.

The larva is velvety green, sometimes with a bluish tinge; the posterior segments more yellowish-green; the paler dorsal line is bordered with rusty or deep red lines, which on each of the fifth to twelfth segments expand into a V-like mark, and enclose a triangular yellowish-white spot; spiracular line yellowish-green, more decidedly yellow on the anterior and posterior segments; the larva has not yet been taken at large, having only hitherto been obtained from the eggs; those have been fed on *Polygonum aviculare,* various species of *Rumex, Anthemis,* and other Compositæ; it feeds in autumn or spring.

The perfect insect appears in August, September, and October, and is *extremely* partial to light; many specimens having been captured on gas-lamps, where it sits with the wings making an extremely inclined roof.

A very interesting circumstance connected with this insect is the curious fact that the Rev. J. Hellins bred six specimens, from six eggs deposited by a female, captured August 19th near Worthing, by Master W. J. Wilson, and that all these six specimens were differently coloured and marked, and not one resembled the parent moth, which was of the ordinary typical form described above. This unexpected chapter in the history of this insect has been made the subject of a paper by Mr. R. M'Lachlan in the Transactions of the Entomological Society of London (vol. ii., third series, p. 453), illustrated by a plate representing the larva, and the six individuals which were reared.

FAMILY XII. ZERENIDÆ.

ABRAXAS GROSSULARIATA. THE LARGE MAGPIE MOTH.

This conspicuous insect is common throughout the country, and is generally very abundant.

The expansion of the wings is rather more than 1½ inch. All the wings are white, with numerous distinct black spots, placed in transverse rows, there being five rows on the fore-wings and three on the hind-wings; the third row of spots on the fore-wings are almost always confluent, so as to form a nearly entire black band; the first and second rows are also sometimes confluent; the fore-wings are also ornamented with an orange blotch at the base, and an orange band beyond the middle, between the third and fourth rows of black spots.

The larva is creamy-white with numerous black spots, with two or three conspicuous large black spots on the back of each segment; the spiracular line is reddish-orange. It feeds on currant, gooseberry, sloe, hazel, etc., in April and May.

The young larvæ may often be noticed in August and September, but they hybernate quite small, and pass the winter without feeding.

The perfect insect appears in July, and may often be observed flying sluggishly in gardens and along hedges, especially towards evening.

FAMILY XII. ZERENIDÆ.

LIGDIA ADUSTATA. THE SCORCHED CARPET.

(Plate XI., Fig. 3.)

This neatly-marked species is widely distributed throughout England, and in the more southern counties is tolerably common; it occurs northward as far as York; in Ireland it has been observed in the counties of Wicklow and Galway.

The expansion of the wings is about an inch. The fore-wings are white with a purplish-brown blotch at the base, beyond the middle is a slightly sinuous purplish-brown band, edged internally with tawny and followed by some tawny and purplish-brown clouds towards the hind-margin. The hind-wings are white, clouded with pale fuscous beyond the middle, and freckled with purplish-grey towards the inner margin.

The larva is generally of a beautiful green, with bright red spots on several of the posterior segments; the head is brown; the legs are yellowish-red. It feeds on spindle in the autumn.

The perfect insect makes its appearance towards the end of May and beginning of June, and may sometimes be observed sitting on the leaves of the spindle, or on palings; it come not unfrequently to light.

Family XIV. Hybernidæ.

HYBERNIA LEUCOPHEARIA. THE SPRING USHER.

(Plate XI., Fig. 4 ♂.)

This variable and pretty insect, which so often tempts the young collector into woods in February and March, is generally distributed throughout the country and very common.

The female is perfectly apterous. In the male the expansion of the wings is about 1¼ inch. The fore-wings are whitish, marbled with brown and dark fuscous, near the base is a curved black line, and the space between it and the base is sometimes entirely dark fuscous; nearly in the middle of the wing is a very sinuous transverse black line, which is immediately followed by a broad brownish band, between which and the hind-margin there is frequently a slender pale band.

The larva is pale yellowish-green, with a double yellowish dorsal line and paler subdorsal lines; sometimes it is dotted with yellowish-white; it varies considerably in colour. It feeds on oak in April and May, attacking the young buds before they are expanded.

The perfect insect appears in February, and continues out some time; in forward seasons it may be met with in January. The male is frequently found sitting on the trunks of oaks in the daytime, and may be sometimes noticed on palings; it comes occasionally to light.

The female is best obtained by breeding, it is very seldom found in the perfect state.

FAMILY XIV. HYBERNIDÆ.

ANISOPTERYX ÆSCULARIA.

This species is also common, and generally distributed throughout the country.

The female is perfectly apterous, but is readily distinguished from the female of the last-named species, by the brush-like tuft at the extremity of the abdomen. In the male the expansion of the wings is rather more than 1¼ inch. The fore-wings are dull brownish with an indistinct pale band before the middle, edged externally with dark fuscous, and with a more distinct pale band beyond the middle, much serrated and edged internally with dark fuscous; between these bands is an elongate dark central spot; the hind-wings are very pale fuscous with a dark fuscous central spot.

The larva is pale green, marbled with darker, with a white subdorsal line. It feeds on sloe and hawthorn, etc., in May.

The perfect insect appears in March and the beginning of April; and the male may be constantly observed at rest on palings, the fore-wings overlapping one another so as to give it a peculiar elongate appearance; sometimes we find it sitting on hedges at dusk, and it comes rather freely to light; the female is seldom met with at large, but may sometimes be found by carefully searching the hedges with a lantern; it is more easily obtained by breeding, and may be immediately recognized by the brush-like anal tuft.

FAMILY XIV. LARENTIDÆ.

EUPITHECIA VENOSATA. THE NETTED PUG.

(Plate XI., Fig. 5.)

This neatly-marked species is not uncommon in the south of England, in localities where the bladder-campion (*Silene inflata*) grows freely; it has been noticed as far north as Darlington; in Ireland it seems generally distributed, and is very common at Howth.

The expansion of the wings is nearly an inch. The fore-wings are ochreous-grey, with two wavy whitish bands, one before the middle, the other beyond the middle, both are edged with black and intersected by a fine blackish line; there is a transverse black line near the base, and another nearly in the middle of the wing, where there are also some black veins, and towards the hind-margin several of the veins are indicated by black lines, so that altogether the black markings on the pale ground almost form a sort of network.

The larva is dull leaden grey on the back, sparingly studded with minute white spots and short hairs; the sides are of a dirty greenish-white. It feeds inside the seed-capsules of the bladder-campion (*Silene inflata*) and the common red lychnis (*Lychnis dioica*) in July.

The perfect insect appears in May, but is seldom seen, though the larva is by no means uncommon; it may sometimes be observed on palings, and occasionally it will come to light.

FAMILY XIV. LARENTIDÆ.

MELANIPPE PROCELLATA. THE CHALK CARPET.

(Plate XI., Fig. 6.)

This very pretty insect seems restricted in its range with us to the south of England, where it occurs in various localities on chalky soils; in Ireland it has not been observed.

The expansion of the wings is about 1¼ inch. The fore-wings are white, with several transverse wavy darker lines; at the base is a greyish-brown blotch, and there is a large blotch of the same colour on the middle of the costa; along the hind-margin is a rather broad brownish band, intersected by a slender wavy whitish line, and interrupted a little below the middle by a large white blotch, which runs into the cilia.

The larva is ochreous-brown, with a varied dorsal stripe, which swells into conspicuous dark blotches on the sixth, seventh, eighth, and ninth segments; before and after these blotches the dorsal stripe is first reddish and then deep black; the tenth to thirteenth segments are paler. It feeds on traveller's-joy (*Clematis Vitalba*) in August and September.

The perfect insect appears in June and July; and is sometimes beaten from bushes in chalky districts; occasionally it may be found at rest on palings.

FAMILY XIV. LARENTIDÆ.

MELANIPPE MONTANATA. THE SILVER-GROUND CARPET.

This elegant species is very common throughout the country.

The expansion of the wings is rather more than an inch. The fore-wings are whitish, with numerous faint pale grey transverse markings, and with a more conspicuous brownish central band, attenuated below the middle; in this band is the black central spot, frequently particularly conspicuous from being placed in a whitish blotch; at the base there is also a small paler brownish blotch.

The larva is pale brown, with numerous darker longitudinal stripes, and with conspicuous black V-shaped marks on the back of the seventh, eighth, and ninth segments. It feeds on primrose in the spring.

The perfect insect appears towards the end of May, and keeps out some time; it is very plentiful in open places in woods, and is easily started from its repose during the daytime, but it flies rather wildly; sometimes we may see it at rest on palings; it comes freely to light.

FAMILY XIV. LARENTIDÆ.

MELANIPPE FLUCTUATA. THE GARDEN CARPET.

This is likewise an abundant species throughout the country, frequenting gardens.

The expansion of the wings is about an inch. The fore-wings are whitish, with numerous wavy transverse greyish lines, and with three conspicuous dark greyish-brown blotches, one at the base, a larger one on the costa in the middle, reaching nearly halfway across the wing, and containing within it the central black spot, and a smaller one on the costa towards the tip.

The larva is brownish, with numerous darker longitudinal stripes, and some conspicuous black dorsal spots from the fifth to twelfth segments; the sides are paler. It feeds on cabbage, horse-radish, etc., in June and September.

The perfect insect appears towards the end of April and in May, and again in July and August; we often see it sitting outside windows, or on the walls of houses, or on palings, and sometimes dislodge it from bushes in the daytime; it comes freely to light.

FAMILY XIV. LARENTIDÆ.

ANTICLEA DERIVATA. THE STREAMER.

This very handsome insect seems pretty generally distributed throughout the country, and in some places is not uncommon; in Scotland it has been noticed near Edinburgh, and in the county of Ayr; in Ireland it is common in the county of Wicklow.

The expansion of the wings is rather more than an inch. The fore-wings are pale grey, with a delicate purplish tinge, and with a broad central band nearly white; this is preceded by a narrow dark grey, rather sinuous band; beyond the middle of the costa an oblique dark grey streak runs nearly to the middle of the hind-margin; the hind-margin is clouded with brownish.

The larva is pale green, with the head and a dorsal line, of variable breadth, red; the legs are pale red; it feeds on rose in June and July.

The perfect insect appears towards the end of April and in May, just when the lilacs are coming into blossom, and all nature seems teeming with enjoyment at the approach of summer; we may then see this pretty species reposing on palings, or may occasionally dislodge it from bushes in the daytime, or meet with it flying along hedges towards dusk.

PYRALIDINA. FAMILY I. HYPENIDÆ.

HYPENA PROBOSCIDALIS. THE SNOUT.

This conspicuous but dull-coloured insect is generally abundant throughout the country; it obtains its trivial name from the unusual development of the palpi.

The expansion of the wings is about 1¼ inch. The fore-wings are brown, speckled with darker brown, and with two distinct transverse dark brown lines, the first of which, before the middle of the wing, is considerably indented; the second, beyond the middle, is only slightly sinuous; towards the hind-margin are some indistinct darker clouds.

The larva is velvety-green, with a darker dorsal line, and with paler subdorsal lines; it feeds on stinging-nettle in May.

The perfect insect appears in June and July, and may often be disturbed from weedy banks in the daytime; towards dusk we may see it fluttering amongst the stinging-nettles.

Some authors repute the species double-brooded, but that seems a question requiring further elucidation; the flood of light which has streamed upon us of late years with reference to the larvæ of the GEOMETRINA, thanks to the exertions of Mr. Buckler, the Rev. H. Harper Crewe, and the Rev. J. Hellins, has not been extended to the less attractive larvæ of the PYRALIDINA; let us hope that for them also there is "a good time coming."

FAMILY IV. PYRALIDÆ.

PYRALIS COSTALIS. THE GOLD FRINGE.

(Plate XII., Fig. 1.)

This pretty species seems restricted in its range to the more southern counties of England, and is not very common.

The expansion of the wings is about ¾ inch. All the wings are of a rosy-grey, with two slender yellowish transverse lines, which on the costa of the fore-wings expand into triangular yellow blotches; all the cilia are clear yellow.

The larva has not hitherto been observed.

The perfect insect appears in July and August; it may sometimes be observed at rest on palings, and it comes occasionally to light.

FAMILY IV. PYRALIDÆ.

PYRALIS FARINALIS. THE MEAL MOTH.

Very abundant throughout the entire country.

The expansion of the wings is about an inch. The fore-wings are rather gaily coloured; at the base is a reddish-grey blotch, then follows a slender, whitish, transverse line, and then the entire central portion of the wing is ochreous, rather clouded with greyish towards the inner margin; beyond the middle is a conspicuous sinuous whitish transverse line, whiter towards the costa; beyond this the hind margin is reddish-grey, more conspicuously reddish towards the costa; the hind-wings are pale grey, inclining to whitish towards the hind-margin, with two whitish transverse lines.

The larva is dull whitish, with a reddish-brown head, and with the thorax and anal plates pale reddish-brown; it feeds on flour, corn, etc. (making itself quite at home in our flour chests), in April and May.

The perfect insect appears in June, and keeps out for some time; we sometimes find it in houses and stables; occasionally we see it at rest on palings; it comes very freely to light, as does also its congener *Pyralis glaucinalis.*

Family VI. Ennychidæ.

PYRAUSTA PURPURALIS. THE CRIMSON AND GOLD.

(Plate XII., Fig. 2.)

This pretty species is generally distributed, and common in the south of England, but seems less common northwards; it occurs however in the Cumberland Lake district, and has been observed in Scotland in the Isle of Arran; in Ireland it appears to be common.

The expansion of the wings is about ¾ inch. The fore-wings are purple, with a conspicuous deep yellow curved band beyond the middle, which is formed by three tolerably distinct spots; before this is a small deep yellow central spot; at the base of the wing the purple ground-colour is rather suffused with yellowish; towards the hind-margin is a faint pale yellow streak; the hind-wings are blackish, with a conspicuous pale yellow band, preceded by a pale yellow spot; towards the hind-margin is a short rosy streak.

The larva is dark grey, with yellowish dorsal and spiracular lines; the spots are black, edged with white; it feeds on mint, marjoram, and other labiate plants in June and July.

The perfect insect appears in May, and continues to be met with during the summer; in forward seasons I have met with it in the middle of April; it flies by day over the short turf on dry chalky or sandy hillsides, settling on flowers. The allied species, *Pyrausta puniccalis* and *P. ostrinalis,* have very similar habits.

FAMILY VI. ENNYCHIDÆ.

ENNYCHIA CINGULALIS. THE SILVER-BARRED SABLE.

This neatly-marked insect is widely distributed, and occurs at any rate as far north as Edinburgh, where I have repeatedly taken it on the slippery slopes of Arthur's Seat; it also occurs on grassy slopes in Dumbartonshire; in Ireland it does not appear to have been observed.

The expansion of the wings is a little more than ½ inch. All the wings are black, with a slender slightly curved white band, central in the hind-wings, but a little beyond the middle of the fore-wings; the fore-wings are of rather a deeper black than the hind-wings, and sometimes they show a slender whitish band near the base, which is not however continued on the hind-wings.

The larva appears to have hitherto escaped observation.

The perfect insect appears in May, and continues to occur during the summer, frequenting grassy hillsides, and flying by day in the hottest sunshine.

The closely allied *E. anguinalis,* readily distinguished by the more wavy white band of the fore-wings being often preceded by a distinct white spot, and by the pale band near the base being continued as a whitish blotch on the hind-wings, frequents similar localities at the same time, the two species being often on the wing together. The conspicuous-looking White Spot (*E. octomaculata*), on the other hand, frequents open places in woods, such places as have had the trees thinned within the last two or three years.

Family VI. Steniadæ.

DIASEMIA LITERALIS. THE LETTERED CHINA-MARK.

(Plate XII., Fig. 3.)

This pretty species is not common, it has occurred in various localities in the south of England, most frequently near Plymouth.

The expansion of the wings is about ¾ inch. The fore-wings are brown, with some irregular white markings, which on the right wing have a tendency to form the letters I N; some of the veins are indicated by ochreous dashes, which intersect the I and the first portion of the N, but the last stroke of the N is very distinct and quite uninterrupted; the hind-wings are grey, with two white bands, the second of which ceases near the middle of the hind margin.

The larva is still unknown to us.

The perfect insect appears in July, and flies on dry grassy slopes, just such places as are haunted by the sun-loving *Ennychidæ*.

The closely allied *Diasemia Ramburialis* is a very scarce species in this country; Mr. Boyd first met with it in Cornwall, Mr. Verrall has since taken it near Lewes.

FAMILY IX. HYDROCAMPIDÆ.

CATACLYSTA LEMNATA. THE SMALL CHINA-MARK.

(Plate XII., Fig. 4 ♂, 5 ♀.)

This neatly-marked little species is common throughout the country.

The expansion of the wings is rather less than ¾ inch in the male, rather more in the female. The male has the fore-wings white, with scarcely any perceptible markings except a blackish central spot and a pale fuscous cloud along the hind margin; the hind-wings are white, with a dark grey central spot and some greyish transverse lines, and nearly in the middle of the hind margin is a conspicuous black blotch, enclosing four or five silvery dots. The female has the fore-wings pale brown, with a darker central spot, and some indistinct darker transverse markings; the hind-wings are very similar to those of the male, but the transverse grey markings are broader and more strongly expressed.

The larva is sooty-brown, paler between the segments; the head is brownish-yellow, above velvety-black; it feeds in April, May, and June on duckweed, beneath the surface of the water, and constructs a case of leaves of the duckweed and bits of grass.

The perfect insect appears in June and July, and flies over the surface of duckweed-covered ponds; on a sultry day the male looks deliciously cool in his snowy-white dress, just skimming above the surface of the water; towards dusk they may be noticed more freely on the wing, but the female is much more sluggish than the male, and from her duller colouring less frequently attracts our attention.

FAMILY IX. HYDROCAMPIDÆ.

HYDROCAMPA NYMPHÆATA. THE BROWN CHINA-MARK.

This prettily marked species is very common, and generally distributed throughout the country.

The expansion of the wings is about an inch. The fore-wings are pale brownish, with three conspicuous white blotches edged with dark brown; two of these blotches are placed near the costa nearly in the position of the orbicular and reniform stigmata in the *Noctuina*; the third blotch is situated below the first one; a white streak precedes the yellow hind-margin, but is intersected by dark dashes at each of the veins; the hind-wings are white with a central ear-shaped pale brown spot, edged with dark brown; between this and the base are two transverse dark brown lines, and beyond it is first a transverse dark brown line, then a brown band of variable width, from which some teeth project towards the yellow hind-margin.

The larva is dull yellowish-white, with a brownish tinge on the anterior segment; it feeds in April and May on the leaves of water-lilies and *Potamogeton*, constructing a flat case.

The perfect insect appears in June and July, and may often be met with in considerable plenty in the vicinity of ponds and streams.

The closely allied Beautiful China-Mark (*H. stagnata*) has a much neater look; it is readily distinguished by the white band towards the hind-margin of each wing being quite entire and uninterrupted; it appears at the same time and frequents similar localities to the preceding.

FAMILY X. BOTYDÆ.

BOTYS URTICATA. THE SMALL MAGPIE MOTH.

(Plate XII., Fig. 6.)

This conspicuous and pretty species is very common throughout the country.

The expansion of the wings is nearly 1¼ inch. All the wings are white, with the hind-margin black, and a black interrupted band beyond the middle; the fore-wings have in addition the costa also black, a large black central spot, and an interrupted black band before the middle; this latter is only represented on the hind-wings by a single black spot.

The larva is dull whitish, with a dull green dorsal line, edged on each side with yellowish-white; the heads and second segment are black; it feeds on stinging-nettle in September, and when full-fed it crawls away to some hiding-hole to pass the winter, taking refuge under the loose bark of trees, or in hollow stems, where it remains till the spring before it changes to the pupa state.

The perfect insect appears towards the middle of June and in July, and is common on weedy banks amongst stinging-nettles, flying of its own accord towards dusk, and readily attracting our attention from the striking contrast of its colours; occasionally it will enter houses, being attracted by light.

FAMILY X. BOTYDÆ.

PIONEA FORFICALIS. THE GARDEN PEBBLE.

This rather dull-looking, but neatly-marked species is generally distributed throughout the country, and very plentiful.

The expansion of the wings is rather more than an inch. The fore-wings are pale whitish-ochreous, clouded with pale brownish; from the tip of the wing a brown streak runs obliquely to the middle of the inner margin, between it and the brown hind-margin is a more slender, less oblique grey streak; in the centre of the wing are two dark spots, almost united in the form of an hour-glass; they are preceded and followed by the transverse lines, which are very deeply indented, and run very obliquely towards the inner margin.

The larva is yellowish-green, with the dorsal and spiracular lines darker green; the head and incisions of the segments are more yellowish; it feeds on cabbage, horse-radish, etc., in June and July, and again in the autumn.

The perfect insect appears in May, and again in August; we often see it sitting on garden-fences, or outside the windows of houses; it flies freely towards dusk, and comes readily to light.

FAMILY X. BOTYDÆ.

SPILODES CINCTALIS. THE LESSER PEARL.

(Plate XII., Fig. 7.)

This elegant species is not uncommon in many localities in the south of England, where it rather appears to favour chalky soils; it does not seem to occur in the north of England, or in Scotland, and has not been hitherto observed in Ireland.

The expansion of the wings is about 1¼ inch. The fore-wings are pale yellowish, with two darker spots towards the costa near the middle of the wing, and with two slender, rather serrated, pale grey bands towards the hind margin; the hind-wings are whitish-yellow, with a dark grey band towards the hind-margin, and a rather paler central band.

The larva, which does not appear to have been hitherto described, is stated to feed on broom in June.

The perfect insect appears in July and August, and may be started from its repose during the daytime, or met with flying of its own accord towards dusk.

FAMILY XII. CHOREUTIDÆ.

SIMAËTHIS FABRICIANA. THE NETTLE TAP.

This fussy little insect is generally distributed throughout the country, and very abundant.

The expansion of the wings is about ½ inch. The fore-wings are dark brown, with a wavy blackish band before the middle, and another beyond the middle, edged externally with pale yellow; the hind-wings are dull brown, with a slender whitish streak towards the anal angle.

The larva is pale yellowish-white, with the head and second segment pale greyish-brown; the spots are also pale greyish-brown; it feeds on stinging-nettle and pellitory (*Parietaria*), drawing together the growing shoots at the top of the plant, and may be found almost continuously from April to August.

The perfect insect makes its appearance early in June, and continues to distract the attention of the collector till quite the end of summer, as it is always flying before him with its peculiar mazy flight when he is looking for game of more importance; many hundreds are turned out of the net every year, having been captured in the hopes of being something better.

The allied *Simaëthis pariana* is common in gardens, but is more freely obtained in the larva state,—the larva feeding on apple and hawthorn. The very pretty silver-spangled *Choreutes scintillulana* is found in boggy places amongst *Scutellaria*, and the rare *C. vibrana* amongst flea-bane (*Inula dysenterica*).

FAMILY XIII. EUDOREIDÆ.

EUDOREA FREQUENTELLA.

This dull-looking little moth is common, and generally distributed throughout the country.

The expansion of the wings is nearly ¾ inch. The fore-wings are pale grey, with two transverse paler lines, one before the middle, the other beyond the middle; the first is followed by a dark greyish-ochreous band, in which are two black spots, one above the other; a little beyond the middle is a black X-like mark filled up with grey; beyond the second transverse pale line, are two dark grey blotches, one from the costa, the other from the inner margin, sometimes they unite to form a band, attenuated in the middle; beyond this, on the middle of the hind-margin, is a small dark grey blotch.

The larva is dull yellowish-green, with the head dark brown, and the second segment black; the spots are large and shining greenish-black; it feeds in the spring in the moss growing on walls, thatch, trunks of trees, etc.

The perfect insect appears in June, July, and August, and may often be observed sitting on the trunks of trees or on palings; in repose it forms an elongate triangle, the fore-wings overlapping one another and maintaining a flat position.

There are many species of this genus, all very similar in markings; in some the X-like mark passes more into the form of a figure 8.

FAMILY XV. PHYCIDÆ.

ACROBASIS CONSOCIELLA.

(Plate XIII., Fig. 1.)

This species is not at all uncommon in the south of England, and occurs northwards as far as Birkenhead in Cheshire; it has not been observed in Scotland or in Ireland.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are of a delicate reddish-grey, with a whitish band near the base, followed by a black transverse line; immediately beyond this is a wedge-shaped dull orange spot, broadest on the inner margin; nearly in the centre of the wing, placed in an oblique paler cloud, are two small black spots, one above the other; beyond them is a sinuous, dark, transverse line, followed by a whitish line, and then a slender dark grey band.

The larva is sulphur-yellow, with slender brownish stripes; the heads and second segment are pale brownish-yellow, spotted with darker brown; it feeds in May and June on the leaves of the oak, preferring bushes growing in hedges, uniting several leaves together, and several of the larvæ living in company they discolour the leaves by eating half the thickness, so that the bundle of yellowish-green leaves fastened together, when all the other oak leaves are of a fresh green, readily attracts our attention; hence the species is collected with great ease in the larva state. (The habits of the larvæ of the two allied species, *A. tumidella* and *A. rubro-tibiella*, are, I believe, precisely similar.)

The perfect insect appears in July and August, and may occasionally be beaten from oak-bushes, or observed at rest on palings; like most of this family of the "Knot-horns" it comes rather freely to light.

FAMILY XV. PHYCIDÆ.

CRYPTOBLABES BISTRIGA.

(Plate XIII., Fig. 2.)

This rather obscure-looking species has not been observed in many localities. I have repeatedly taken it at Lewisham, and once beat more than half-a-dozen specimens from a low hedge, principally composed of oak; it has been noticed in the New Forest, near Lyndhurst, and also near Bristol; northwards it has occurred near Manchester, and at Chesterfield.

The expansion of the wings is very nearly ¾ inch. The fore-wings are dull reddish-grey, with scarcely any perceptible markings except two transverse pale (almost whitish) streaks, one obliquely placed, not far from the base, the other towards the hind margin, and nearly parallel to it.

The larva was found by Herr von Hornig, of Vienna, feeding on alder; but I strongly suspect that it also feeds on oak; there was no alder near the locality where I found my specimens.

The perfect insect appears towards the end of June and July; it is generally attained by beating, but will occasionally come to light.

FAMILY XV. PHYCIDÆ.

MYELOIS CRIBRUM.

This conspicuous species seems to be quite confined to the southern counties of England, and the localities recorded for it are not numerous. It used to occur on the chalk downs near Croydon, and has been observed near Bristol; also at Southend, on the Essex coast, and at Brandon in Suffolk.

The expansion of the wings is rather more than an inch. The fore-wings are white with several distinct black dots, thus arranged: one very near the base, then two before the middle transversely placed (one near the costa and one near the inner margin), then one in the centre of the wing; then beyond the middle are a number of these dots transversely placed in two rows, so as almost to form the letter V; lastly, there is a row of black dots along the hind margin.

The larva is greyish, striped with bluish-green; the head is of a dark brown, almost black; the second segment is brownish; it feeds in the stems of thistles in the autumn and winter; being full fed early in the spring.

The perfect insect appears in July and August; it may sometimes be met with flying amongst thistles; where met with it is generally rather gregarious.

FAMILY XV. PHYCIDÆ.

PEMPELIA CARNELLA.

(Plate XIII., Fig. 3.)

This gaily-coloured species is not at all uncommon where it occurs; but has been only observed in a few localities in the south of England, principally near the coast.

The expansion of the wings is about an inch. The fore-wings are rosy, with a broad yellow stripe along the inner margin, occupying nearly one-half of the width of the wing; there is often a pale yellowish or whitish streak just below the costa, but in other specimens that portion of the wing is entirely rosy.

The larva seems hitherto to have escaped observation.

The perfect insect appears in July; and may be readily disturbed from the herbage as we walk along, in a locality frequented by this insect.

FAMILY XV. PHYCIDÆ.

PEMPELIA FORMOSA. THE BEAUTIFUL KNOT-HORN.

(Plate XIII., Fig. 4.)

Few localities have been recorded for this pretty species, of which at one time I caught a considerable number at Lewisham by means of my attracting light, and I apprehend it might be obtained in many parts of the south of England by the same device.

The expansion of the wings is about ¾ inch. The fore-wings are of a pale reddish-grey, more distinctly reddish along the base of the inner margin; nearly in the middle of the wing is a rather broad, blackish, transverse shade, followed by a whitish transverse line, which, however, is only distinct towards the inner margin, being suffused with grey towards the costa; beyond this are two black spots on the disk, which are generally united so as to form a short curved streak; towards the hind-margin is a sinuous, pale, transverse line, edged on both sides with dark grey.

The larva which has not yet been observed, will, I believe, prove to be an elm feeder; it should be sought for in May.

The perfect insect appears in June and July, and though it may sometimes be dislodged from hedges by the beating-stick, it may be more readily obtained by its partiality for light.

FAMILY XVI. CRAMBIDÆ.

CRAMBUS CERUSSELLUS.

(Plate XIII., Fig. 5, ♂ and ♀.)

This small species, the smallest we have in the genus, is, like most of its congeners, very plentiful where it occurs; in the south of England it rather affects chalky soils, and the Londoner will find it plentiful in the neighbourhood of Mickleham; northwards it has been noticed near Manchester; it has not hitherto been detected in Ireland.

The expansion of the wings is about ½ inch. The two sexes are very different in colour, but the markings are quite similar. The male has the fore-wings of a dull brown, with two darker sinuous transverse lines beyond the middle, the second of which is externally edged with paler; along the hind-margin near the anal angle are three or four black dots; in the female the fore-wings are whitish, faintly clouded with pale brownish towards the costa, and along the hind-margin.

The larva does not appear to have been observed; but nearly all the larvæ of this genus are subterranean in their habits, feeding on the roots of moss, and, moreover, they are very similar in appearance, so that this branch of larva-collecting possesses few charms for the entomologist; in addition to which nearly every species of *Crambus* can be taken in plenty in the perfect state, if we once find its haunts. As most of the females deposit their eggs very freely, the time may come when we shall learn to rear them from the egg.

The perfect insect appears in June, and may be observed in plenty flying amongst the short grass, when disturbed by the approach of the collector.

FAMILY XVI. CRAMBIDÆ.

CRAMBUS PRATELLUS.

This common grass-moth is generally distributed throughout the country, and very plentiful.

The expansion of the wings is about ¾ inch. As in the last-named species, the female is much paler in colour than the male, which has the fore-wings brown, with a slender, angulated, darker transverse line toward the hind-margin, edged externally with silvery, and followed by a triangular white spot on the hind-margin near the costa, and four black dots along the hind-margin near the inner margin; a white streak proceeds from the base along the centre of the wing, it has a short spur on its lower edge in the middle, and terminates in an acute point beyond the middle; it is followed by a small whitish blotch, and a few short longitudinal silvery-leaden streaks; the female has the fore-wings much paler, sometimes almost whitish, but the markings are precisely similar.

The perfect insect appears about the middle of May, nearly at the same time as the Common Swift (*Hepialus lupulinus*) (see *ante*, p. 140), and continues out through the month of June and a great part of July; it flies in profusion in every hayfield and grassy meadow; it comes very freely to light.

FAMILY XVI. CRAMBIDÆ.

CRAMBUS HAMELLUS.

(Plate XIII., Fig. 6.)

This brightly marked species occurs not uncommonly on the sandy district about Weybridge, and also in the New Forest; northwards it has been met with near Manchester; and in Ireland, it has occurred near Killarney.

The expansion of the wings is nearly an inch. The fore-wings are glossy brown, with a broad, conspicuous, silvery-white streak from the base to considerably beyond the middle, when it tapers from each side to a point; on its lower side, nearly in the middle of the wing, is a small tooth-like projection; and beyond the end of this streak is an angulated, transverse, dark line, and the other markings as in the preceding species.

The perfect insect appears in July, and may be readily started as we walk along the heather in the localities which this species frequents; like most of its congeners, where found it will be in tolerable plenty.

FAMILY XVI. CRAMBIDÆ.

CRAMBUS PINETELLUS.

(Plate XIII., Fig. 7.)

This pretty and conspicuous species is very widely distributed thoughout the country, and is not uncommon; it occurs in several parts of Scotland, and in Ireland has been noticed both at Killarney and at Blarney.

The expansion of the wings is about an inch. The fore-wings are of a rich yellow-brown, mottled with darker beyond the middle; from the base arises a pearly white wedge-shaped blotch, which reaches to the middle; beyond this, separated only by a thin, dark brown streak, is a rhomboidal pearly-white blotch edged with dark brown.

The larva has not, I believe, been hitherto observed, but it is not improbable that it may feed on the lichens on the trunks of fir-trees.

The perfect insect appears in July and August, and is not unfrequently beaten from fir-trees.

FAMILY XVI. CRAMBIDÆ.

CHILO FORFICELLUS.

This insect is, I believe, tolerably generally distributed in the south of England, and occurs northwards as far as York and Manchester: it has not been observed in Scotland, but occurs in Ireland, at Killarney.

The expansion of the wings is about an inch. The fore-wings are pale greyish-ochreous, more or less tinged with brownish towards the costa, and with an oblique, dark brown streak from the tip of the wing, reaching nearly to the inner margin; on the disk beyond the middle is a conspicuous black spot, and there are frequently two or three fainter dark spots along the fold; the hind-wings are whitish, with a faint greyish streak rather obliquely from the apex.

The larva is greyish-green, posteriorly paler, with a dark green dorsal line; the head is black, and the second segment spotted with black; it feeds in the stems of *Poa aquatica* in May.

The perfect insect appears in June and July, and flies at dusk amongst the *Poa aquatica*; occasionally it comes to light.

FAMILY CHLOEPHORIDÆ. (This is the family intermediate between the PYRALIDINA and the TORTRICINA.)

CHLOEPHORA PRASINANA. THE GREEN SILVER-LINES.

This fine-looking insect is not uncommon in various parts of the south of England, and it occurs at any rate in the south of Scotland, where I have myself met with it in Stirlingshire; in Ireland it has been noticed in the county of Wicklow.

The expansion of the wings is rather more than 1¼ inch. The fore-wings are green, with three oblique silvery lines, of which the first is near the base, the second a little beyond the middle, and the third towards the hind-margin; the cilia have a reddish tinge; the hind-wings of the male are of a dull yellowish-green, those of the female white.

The larva, which at a first glance we might almost fancy the larva of one of the *Notodontidæ*, is pale green dotted with yellow, with yellow subdorsal lines, and with the front edge of the second segment yellowish-red; it feeds on various trees, oak, hazel, etc., in August and September.

The perfect insect appears in May and June; and may be occasionally beaten from bushes in the daytime.

The allied but scarcer *Chloephora quercana* is readily distinguished by its larger size (the expansion of the wings is about 1¾ inch), and the brighter green anterior wings are only traversed by two oblique pale yellow lines; it occurs round London, the larva feeding on oak.

The smaller *Earias clorana* (of which the expansion of the wings is rather less than an inch) has no transverse lines, but a broad whitish streak along the costa of the fore-wings from the base to beyond the middle; otherwise the fore-wings are of a brilliant green. The white hind-wings distinguish this at a glance from the common Green Tortrix (*T. viridana*), independently of the white costal streak of the fore-wings. *E. clorana* frequents osier beds, and the larva may be collected freely in the terminal shoots of osiers in August.

TORTRICINA. FAMILY I. TORTRICIDÆ.

ANTITHESIA CORTICANA.

(Plate XIV., Fig. 1.)

This very pretty species occurs in several localities in the south of England; it used to be common at Dulwich Wood, and also occurs at West Wickham Wood, Epping Forest, etc.

The expansion of the wings is about ¾ inch. The fore-wings have the basal two-thirds blackish, but with two large white blotches on the costa, one at the base and the other before the middle, and from the middle of the base a broad white streak runs along the fold nearly to the middle; thus the basal portion of the wing is prettily varied with white, but the blackish colour forms a broad, rather oblique uninterrupted band beyond the middle; beyond this the apical third of the wing is white, sparingly clouded with pale grey.

The perfect insect appears in June and July, and may be found in the daytime resting on the trunks of trees.

FAMILY I. TORTRICIDÆ.

SIDEREA ACHATANA.

(Plate XIV., Fig. 2.)

This species seems widely distributed in the south of England, and in some localities it is far from uncommon.

The expansion of the wings is about ½ inch. The fore-wings are pale grey, with a large dark brown patch at the base; on the middle of the costa is a small quadrate dark brown spot, and on the inner margin beyond the middle is a larger triangular spot of the same colour; on the costa at the tip is a rather triangular reddish-brown spot.

The perfect insect appears in June and July, and frequents hawthorn hedges, from which it may often be obtained by beating during the daytime, or flying of its own accord towards dusk.

FAMILY I. TORTRICIDÆ.

TORTRIX VIRIDANA. THE GREEN TORTRIX.

This pretty species is common, sometimes in extreme profusion, and generally distributed throughout the country.

The expansion of the wings is about ¾ inch. The fore-wings are pale green, with the costal edge sulphur-coloured; the hind-wings are grey.

The larva is green, posteriorly yellowish-green, with the head brownish; the spots are small and black; it feeds on oak, hornbeam, etc., in May and June; sometimes it occurs in such quantities that the trees in an oak wood will be stripped of their leaves, and present a bare appearance just when Midsummer is at hand.

The perfect insect appears towards the end of June and in July; we may generally dislodge a small shower of these pretty green moths by tapping smartly the end of an oak bough with the beating-stick at that period of the year.

FAMILY II. PLICATÆ.

NOTOCELIA UDMANNIANA.

(Plate XIV., Fig. 3.)

This rather conspicuous species seems pretty generally distributed throughout the country, and tolerably common; in Ireland it has been noticed in the neighbourhood of Dublin.

The expansion of the wings is nearly ¾ inch. The fore-wings are pale grey, with a large dark grey patch occupying the entire basal portion of the wing, extending along the costa to beyond the middle, and there is a small dark grey patch along the hind margin towards the costa; the most conspicuous mark is, however, a triangular chocolate-coloured spot on the inner margin towards the anal angle, neatly outlined with whitish; in the extreme apex of the wing is a smaller and far less distinct chocolate-coloured spot.

The larva is of a dull reddish-brown, with the head black; it feeds in the then expanding shoots of bramble in April and May.

The perfect insect appears in June and July, and may often be obtained by beating hedges; it comes rather freely to light.

FAMILY II. PLICATÆ.

DICRORAMPHA SEQUANA.

(Plate XIV., Fig. 4.)

This neat little species is widely distributed, and not uncommon in many localities; it does not appear to have been noticed in Scotland or Ireland.

The expansion of the wings is rather less than ½ inch. The fore-wings are greyish-brown, paler towards the base; on the middle of the inner margin there is a conspicuous whitish blotch, placed nearly perpendicularly, rather broad, and emitting a short tooth from its posterior edge; along the costa are a number of small oblique pale yellowish streaks; along the lower half of the hind-margin are three black dots. (In the closely allied *D. Petiverella* the dorsal blotch is narrower, yellower, and more obliquely placed.)

The perfect insect appears in June, and frequents rather dry, grassy places.

FAMILY III. ANCHYLOPERIDÆ.

ANCHYLOPERA LUNDANA.

(Plate XIV., Fig. 5.)

This sharply-marked species seems generally common throughout the country; it is no rarity in Scotland, and is generally common in Ireland.

The expansion of the wings is about ½ inch. The fore-wings are whitish-ochreous, with a rich chocolate-brown patch on the inner margin, reaching from the base to beyond the middle, not swelling out abruptly; considerably beyond the middle is a slender angulated bluish line, preceded by a dark chocolate-brown streak from the costa; beyond this are several short yellowish streaks along the costa, in the pale reddish-brown apical portion of the wing; the tip is very decidedly hooked.

The larva is greenish-grey, with a yellowish-brown head, and the second segment rather paler; it feeds in September (probably also in June or July), between united leaves of *Vicia sepium* and *Lathyrus pratensis.*

The perfect insect appears in May and in August, and is often started as we walk along by the side of weedy hedgebanks.

FAMILY III. ANCHYLOPERIDÆ.

CROESIA FORSKALEANA.

(Plate XIV., Fig. 6.)

This delicately-marked insect is very common amongst maple in the south of England.

The expansion of the wings is about ½ inch. The fore-wings are pale ochreous, delicately reticulated with darker ochreous; nearly in the middle is an angulated dark brown line, and sometimes there is a large blackish blotch on the middle of the inner margin; an ochreous-brown line runs along the costa and hind-margin.

The larva is of a pale transparent yellow, with the head and second segment pale yellowish-green; the spots are minute, whitish; it feeds in May and the beginning of

June between folded leaves of the common maple (*Acer campestre*). The perfect insect appears at the end of June and in July, and may be freely beaten from the maple bushes on which the larva has fed.

FAMILY IV. PERONEIDÆ.

PERONEA CRISTANA.

This very variable species occurs in various woods in the south of England, where Epping Forest and the New Forest may be looked upon as its head-quarters; it has also occurred at Whittlebury Forest, near Wolverton; in Ireland, it has occurred near Belfast.

The expansion of the wings is about $\frac{3}{4}$ inch. The fore-wings are extremely variable in colour and markings, but have always a very conspicuous large central tuft of raised scales; sometimes the inner margin is decidedly paler than the rest of the wing, either white, whitish, or ochreous; sometimes there is a ferruginous streak from the centre of the base of the wing; sometimes there is a white oblique streak from the costa near the base, which when it meets the subcostal nervure turns up again towards the costa, its two arms enclosing a small dark-coloured blotch on the costa; the ground-colour of the wings is generally some shade of brown; the colour of the tuft varies just as much as anything else: it may be either dark brown, or ferruginous, or white.

The larva is unknown to us.

The perfect insect appears in August, September, and October, and is most frequently obtained by beating old whitethorn and sloe bushes, the stems of which are covered with lichen.

FAMILY VI. CARPOCAPSIDÆ.

CARPOCAPSA POMONELLA.

This pretty species is common, and generally distributed throughout the country.

The expansion of the wings is about ¾ inch. The fore-wings are grey, with numerous darker transverse lines; at the anal angle is a large ocelloid spot, edged with coppery, and preceded by a curved black streak which arises from the inner margin.

The larva is pale pink, with the head scarcely darker; the second segment is pale yellowish-brown; it feeds inside apples and pears, forming galleries in the substance of the fruit, in which it deposits its dark brown excrement; when full fed, it quits the fruit.

The perfect insect appears in June and July, and may often be observed at rest on the trunks of orchard-trees.

FAMILY VII. CNEPHASIDÆ.

CNEPHASIA SUBJECTANA.

A most abundant species throughout the country.

The expansion of the wings is rather more than ½ inch. The fore-wings are pale grey, at the base a little darker, and with three tolerably distinct dark grey bands: the first, before the middle, angulated and scarcely reaching below the fold of the wing; the second goes from the middle of the costa to the inner margin, a little before the anal angle,—its inner edge is rather irregular; the third runs from the costa before the apex to the hind margin above the anal angle, its lower half is often indistinct, and its outer edge is always undefined.

The larva is dull olive-green, with the head pale brown, and the second segment black; the spots are whitish, with black centres; it feeds in May and June on almost every plant you can think of, and is a great pest to the incipient collector of micro-larvæ; it draws a few leaves together and forms an almost globular apartment, in which when disturbed it will be found coiled up in a ring and extremely sluggish; the young larva is a leaf-miner, feeding below the cuticle of the leaf, and in that state it is constantly being taken home as a prize, as a new mining larva, by those inexperienced in the habits of the creature. The closely allied *C. virgaureana* has habits precisely similar.

The perfect insect appears in June and July, and may be met with by thousands everywhere.

FAMILY VIII. SERICORIDÆ.

SERICORIS LITTORALIS.

(Plate XIV., Fig. 7.)

This coast species has occurred in a variety of localities amongst its food plant, *Statice armeria*, from Essex to the north of Ireland; when met with, it is generally by no means rare.

The expansion of the wings is rather more than ½ inch. The fore-wings are of a whitish-grey, with a dark greyish-brown patch at the base, which terminates in a very distinct darker blotch from the inner margin, reaching a little above the fold, and having its hinder edge nearly perpendicular to the inner margin; a little beyond the middle is a slightly oblique greyish-brown band of variable width, and with its outer margin very irregular; beyond this are some small dark brown spots along the costa, and one at the anal angle, and a larger brownish blotch lies near the hind margin, a little above the middle.

The larva feeds on thrift (*Statice Armeria*), in May and the beginning of June.

The perfect insect appears in July and August, and may be readily started as we walk amongst its food-plant especially towards evening.

FAMILY IX. LOZOPERIDÆ.

PHTHEOCHROA RUGOSANA. THE ROUGH-WING.

This handsome species is widely distributed in the south of England, and far from uncommon in some localities.

The expansion of the wings is about ¾ inch. The fore-wings are whitish-grey, with several rather irregular darker markings, and several conspicuous tufts of raised scales (which, when we first see the insect in the net, give it a very striking appearance); from the costa are three short oblique blotches of a snowy-white, or, when the insect is alive, flesh-coloured; beyond the middle are two rather indistinct, pale, transverse bands; the hind-wings are pale grey, reticulated with darker. The head, palpi, and centre of the thorax are snowy-white.

The larva feeds on bryony (*Bryonia dioica*), in the autumn.

The perfect insect appears at the end of May and beginning of June, and flies on still evenings at dusk; it looks very white on the wing, and from its size is very conspicuous; in the daytime it may often be beaten from hedges, in which its food-plant is intermixed.

FAMILY IX. LOZOPERIDÆ.

CALOSETIA NIGROMACULANA.

(Plate XIV., Fig. 8.)

This handsome and showy insect is widely distributed throughout England and Scotland, and has also been observed in Ireland.

The expansion of the wings is rather more than ½ inch. The fore-wings are white, beautifully varied with blackish; above the anal angle is a large bluish-grey ocelloid patch, edged partially with ferruginous, most distinctly so towards the base of the wing, above it is a short black streak; the tip of the wing is ferruginous, intersected by some short, oblique, whitish streaks; the most conspicuous of the blackish markings are two small costal spots, and obliquely beyond them two larger spots on the inner margin.

The perfect insect appears in July, and may often be beaten from stems of ragwort (*Senecio Jacobæa*), when it generally falls down very sluggishly.

TINEINA. FAMILY I. EXAPATIDÆ.

EXAPATE GELATELLA.

(Plate XV., Fig. 1, ♂ and ♀.)

This species seems widely distributed, though probably much overlooked; it occurs generally round London, and has been noticed near Bristol and in the neighbourhood of York and Manchester; it does not seem to have been observed in Scotland or Ireland.

The female has only very short pointed wings; in the male the expansion of the wings is about ¾ inch. The fore-wings are greyish-brown, with a slight purplish gloss, with a broad paler grey streak from the base along the disk, on which are two dark brown spots, one before the middle and the other beyond the middle.

The perfect insect appears in November and December, and may be sometimes met with flying in the day-time, or found sitting on palings; after dark it may be found sitting on hedges.

FAMILY I. EXAPATIDÆ.

CHIMABACCHE FAGELLA. THE MARCH DAGGER.

(Plate XV., Fig. 2, ♂.)

This species is very generally distributed throughout the country, and very abundant.

The female has the wings only partially developed, the fore-wings terminating in a sharp point; its expanse of wing is about ¾ inch; in the male the expansion of the wings is rather more than an inch. The fore-wings vary much in the shade of colour, they are whitish-grey or yellowish, more or less dusted with brownish, sometimes almost entirely suffused with the darker colour; before the middle is an oblique, dark, transverse line, then follow two or three small black spots on the disk, and then beyond the middle is a short dark streak transversely placed.

The larva has the third pair of anterior legs club-shaped, it is greyish-green, with the head yellowish-grey; it feeds on most kinds of trees and bushes, between united leaves in August, September, and October.

The perfect insect appears towards the end of March and in April, and may be constantly noticed sitting on the trunks of trees; during the cold weather which so frequently occurs in April, when the sloe-bushes are in blossom, these insects often afford the only sport the collector meets with.

FAMILY II. TINEIDÆ.

TINEA TAPEZELLA.

A familar household insect throughout the country.

The expansion of the wings is about ¾ inch. The fore-wings are black from the base to the middle, the black portion extending a little further on the costa than on the inner margin; the apical half of the wing is white, clouded with grey, with a darker grey blotch at the tip.

The larva feeds on cloth, constructing a gallery of pieces of gnawed cloth and its own silk; it is partial to situations much exposed to the air, and is particularly fond of the linings of carriages and green-baize doors; it feeds during the autumn and winter.

The perfect insect appears in June and July, and we often meet with it in houses and outhouses, and sometimes we find it at large sitting on palings; from its contrast of colours, it is very conspicuous.

FAMILY II. TINEIDÆ.

TINEA PELLIONELLA.

Very, very plentiful in houses throughout the country.

The expansion of the wings is about ½ inch. The fore-wings are dull greyish-ochreous, with three rather indistinct brownish spots, two before the middle (of which one is on the disk, and the other, which is the more distinct, is on the fold), and one beyond the middle on the disk; there is sometimes an additional dark spot on the inner margin near the base; the hind-wings are whitish-grey.

The larva is dull whitish, with the head reddish-brown; the second segment bears posteriorly a dark brown plate; it constructs a flattish, portable case of the substance on which it has been feeding, feathers, cloth, etc. etc.; they will often be found domiciled in a bundle of quills, and a store of feathers is a fearful attraction, and they have no objection whatever to ostrich plumes; muffs and furs alike suffer continually from their attacks, and we often see the cases when we enter a hosier's shop and ask to look at some woollen socks; in short, this is a most destructive insect, but is surpassed in its ravages by the next species.

The perfect insect may be found in houses and outhouses throughout the year, being most plentiful during the summer months.

FAMILY II. TINEIDÆ.

TINEA BISELLIELLA.

This household pest is generally distributed throughout the country.

The expansion of the wings is rather more than ½ inch. The fore-wings are glossy pale ochreous, with no spots; the hind-wings are whitish, with pale ochreous cilia.

The larva is whitish; it is particularly fond of horsehair, and destroys the linings of chairs, sofas, mattresses, etc.; when a colony has once effected a settlement they go on breeding, year after year, in the interior of the chair, sofa, etc., till after the lapse of a few years the contents may be entirely destroyed, without our attention having been once called to the mischief which is going on; they are also very destructive to carpets. This larva does not construct a portable case like the last-mentioned species, but forms silken galleries in the substance on which it is feeding.

The perfect insect may be found in houses and out-houses throughout the year, but is more frequent in the summer months.

FAMILY II. TINEIDÆ.

TINEA OCHRACEELLA.

(Plate XV., Fig. 3.)

This species occurs in the New Forest, Hampshire, and at Rannoch, in Perthshire, in the nests of ants.

The expansion of the wings is about ¾ inch. The fore-wings are unicolorous ochreous, perhaps with a very faint greyish tinge posteriorly; the hind-wings are rather dark grey, with ochreous cilia.

The perfect insect appears in July, and is only to be found in the nests of ants; the ants take no apparent notice of the living moths, but if a specimen be killed and thrown into the nest, it is immediately carried off by the ants as booty.

FAMILY II. TINEIDÆ.

INCURVARIA MASCULELLA.

This lively species is very abundant throughout the country.

The expansion of the wings is about ½ inch. The fore-wings are glossy, dark brown, with two pale yellowish, rather triangular spots on the inner margin, one a little before the middle, the other towards the anal angle; in the female there is frequently a small yellowish spot on the costa intermediate between these two; the head is ferruginous; the antennæ of the male are pectinated, of the female simple.

The larva is dull whitish, with the head pale brown, and a darker plate on the second segment; on the third and fourth segments are smaller, paler, grey plates; it forms a flat case (like an elongate oyster-shell) of two pieces cut out of fallen leaves, and fastened together with silk; the young larva is a leaf-miner, and cuts out its first case from the leaf it has mined; it feeds on all sorts of trees and bushes, from June to October.

The perfect insect appears in the beginning of May, and flies merrily by day along hedges in the sunshine in little companies.

FAMILY II. TINEIDÆ.

ADELA DE GEERELLA.

(Plate XV., Fig. 4.)

This conspicuous and handsome insect is common and generally distributed in the south of England, and occurs northwards near Manchester, and in the Cumberland Lake district; in Ireland it occurs near Killarney, but I am not aware that it has been observed in Scotland.

The expansion of the wings is about ¾ inch. The fore-wings are yellow, streaked to the middle with violet-brown; beyond the middle is a nearly straight yellow band, bordered on each side by a violet band; beyond this the yellow ground-colour is almost suffused with violet-brown. The male insect is remarkable for its extremely long antennæ, nearly 1½ inch; the antennæ of the female are much shorter, little longer than the anterior wings.

The larva is yellowish-white, with the head black; the second segment with a blackish plate, and the third and fourth segments with some grey spots above; it constructs a bivalve case of pieces of dead leaves, adding piece after piece till it attains the required length, and feeds on a variety of low plants in the autumn and early spring.

The perfect insect appears in June; it frequents woods and thickets, and flies up and down in the sunshine; its long antennæ and brilliant colouring give it a very graceful appearance.

We have several species of Long-horn moths; the commonest is *Adela viridella,* which disports itself amongst oaks at the end of May, flying up and down in little companies like gnats.

FAMILY IV. HYPONOMEUTIDÆ.

HYPONOMEUTA PADELLUS.

This species is very abundant throughout the country; it sometimes strips the hawthorn hedges perfectly bare in June.

The expansion of the wings is about ¾ inch. The fore-wings are white, more or less tinged with grey (sometimes quite grey), with three longitudinal rows of black dots; the cilia are pale grey, or white with pale grey tips.

The larva is grey, with conspicuous black spots; it feeds in May and June on hawthorn, apple, sloe, etc.; the larvæ hatched from one batch of eggs keep together all their lives, spinning a considerable amount of web, and devouring rapidly all the leaves within their reach.

The perfect insect appears in July and August; it is a sluggish creature, and if disturbed flies with a slow, straight flight, and soon settles again; when at rest its narrow wings are compactly placed round the body, so that it has a very elongate appearance.

An allied species, *H. evonymellus*, devours the spindle bushes, sometimes not leaving a single leaf, and the larger, handsomer *H. padi* feeds on the bird-cherry, *Prunus Padus*.

FAMILY IV. HYPONOMEUTIDÆ.

PRAYS CURTISELLUS.

(Plate XV., Fig. 5.)

This species is generally distributed throughout England, and tolerably common; in Scotland it is abundant near Edinburgh, and in Ireland it has occurred near Belfast and Howth. On the continent of Europe this species is comparatively scarce.

The expansion of the wings is rather more than ½ inch. The fore-wings are white, with a rather triangular blackish blotch on the costa, reaching from the base to beyond the middle, in its broadest part it reaches a little below the fold; in the white portion of the wing are several short, transverse, grey streaks, and the hind margin is clouded with dark grey. In a variety which is sometimes met with, the fore-wings are almost entirely of a sooty-brown.

The larva, which, when adult, is very handsome, greenish marbled with reddish-brown, feeds in May on the shoots of the ash-tree.

The perfect insect appears in June and July, and may often be beaten from ash-trees, or observed sitting on the stems, or on palings near ash-trees.

The insect which does so much mischief to the olive-trees of southern Europe by devouring the tender shoots, is very closely allied to this.

FAMILY V. PLUTELLIDÆ.

PLUTELLA CRUCIFERARUM.

Very abundant, and very generally distributed throughout the country.

The expansion of the wings is rather more than ½ inch. The fore-wings are greyish-brown, spotted with dark brown, with a whitish-ochreous streak along the inner margin, from which three rounded projections cross the fold, and encroach on the darker ground-colour.

The larva is green, with the head and second segment speckled with dark green; the spots are small and grey; it feeds on cabbage, turnip, and various other *Cruciferæ* in June, July, and September.

The perfect insect appears in May and August, and is very common amongst cabbages and turnips, etc.; it flies for a short distance with a steady, straight flight and then settles, holding its antennæ straight out before it. In some years it is particularly abundant, and is then very injurious to turnip fields, the leaves of the turnips being sometimes entirely devoured by the larvæ of this small moth.

FAMILY VI. GELECHIDÆ.

PHIBALOCERA QUERCANA.

(Plate XV., Fig. 6.)

This pretty species is generally common throughout England and Ireland; but I do not remember that it has occurred in Scotland.

The expansion of the wings is about ¾ inch. The fore-wings are of pale rosy-grey, clouded with rosy and with some obscure darker markings; on the costa at the base is a narrow, elongate, pale yellow spot, and on the middle of the costa is a quadrate pale yellow spot; the cilia of the hind margin are also pale yellow; the hind wings are pale whitish-ochreous. The antennæ are rather longer than the fore-wings.

The pale green larva has the dorsal line darker, edged with whitish-green; it feeds on various trees and shrubs in May and June, keeping on the underside of the leaf beneath a flat web.

The perfect insect appears in July and August; it is often beaten out of hedges, when it flutters sluggishly to the ground; it comes rather freely to light, hence is often found in houses.

FAMILY VI. GELECHIDÆ.

YPSOLOPHUS MARGINELLUS.

(Plate XV., Fig. 7.)

This pretty species seems confined to chalky localities in the south of England; the Londoner may find it on the Sanderstead Downs, near Croydon.

The expansion of the wings is rather more than ½ inch. The fore-wings are of a bright ochreous-brown, with a white streak along the costa, and another along the inner margin.

The larva is greyish-brown above, ochreous at the sides; the dorsal and subdorsal lines are reddish-brown; the head is also reddish-brown. It feeds on juniper in May and June, constructing a considerable web in which it lives concealed.

The perfect insect appears in July and August, and may often be beaten out of juniper-bushes in the localities where it occurs.

FAMILY VII. ŒCOPHORIDÆ.

DASYCERA SULPHURELLA.

Common throughout England, Scotland, and Ireland, but very scarce in continental Europe.

The expansion of the wings is rather more than ½ inch. The fore-wings are brownish, dusted with yellow, and with two yellow streaks from the base; beyond the middle of the inner margin is a triangular pale yellow spot, and a smaller similar spot lies beyond it on the costa; the hind-wings are pale yellow, with the tip brownish.

The elongate larva is greyish-brown, with the head and second segment reddish-brown; the spots are blackish. It feeds on decayed wood in the winter and early spring.

The perfect insect appears at the end of April and beginning of May, and may often be observed flying of its own accord in the early morning; we may sometimes find it at rest on palings.

FAMILY VII. ŒCOPHORIDÆ.

ENDROSIS FENESTRELLA.

Abundant in houses throughout the country.

The expansion of the wings is nearly ¾ inch. The fore-wings are dirty grey, clouded with fuscous, with some obscure darker markings; the extreme base is white; the head and thorax are shining snowy-white, and thus render the insect tolerably conspicuous.

The larva is dull whitish, with the head reddish-brown, and the second segment pale brown posteriorly; it feeds throughout the year on a great variety of waste substances, a sort of universal scavenger.

The perfect insect is found in houses throughout the year; we see it sitting on the windows, or on the walls of rooms, and we often find it drowned in milk-pans; in the summer we often meet with it out-of-doors, on palings or trunks of trees.

FAMILY VIII. GLYPHIPTERYGIDÆ.

ANTISPILA PFEIFFERELLA.

(Plate XVI., Fig. 1.)

This species seems widely distributed in England, and is common in many localities; it occurs northward as far as Scarborough. It does not seem to have been observed in Scotland or Ireland.

The expansion of the wings is little more than ⅓ inch. The fore-wings are of glossy golden-brown, with rather a coppery tinge towards the hind-margin; before the middle is a slender, angulated, bright golden band, and beyond the middle are two triangular, golden spots, one on the inner margin, the other a little beyond it on the costa.

The larva is pale greyish-green, with the head and second segment pale brown; it mines large blotches in the leaves of dogwood in June and July, and when full fed cuts out a flat bivalve case, in which it descends to the ground.

The perfect insect appears in May, and may be met with flying in the sunshine round bushes of dog-wood.

The closely allied, but smaller, *A. Treitschkiella* has very similar habits, feeding on the same plant. An interesting note on the difference of the pupation of the two species, by Mr. Charley Healy, will be found in the fourth volume of the 'Entomologist's Monthly Magazine' (p. 10).

FAMILY IX. ARGYRESTHIDÆ.

ARGYRESTHIA NITIDELLA.

This species is generally distributed, and common throughout the country.

The expansion of the wings is very nearly ½ inch. The fore-wings are very pale ochreous-brown, with a darker streak from the middle of the base; a white streak runs along the inner margin, but is interrupted beyond the middle by a curved dark brown fascia, which terminates in the tip of the wing.

The fat yellowish-grey larva has the head brown and the second segment brownish above; it feeds in the young shoots of hawthorn in April and the beginning of May; the full-fed larvæ may be seen descending from a hawthorn hedge by their silken threads during the first and second weeks of May.

The perfect insect appears in June and July, and may be obtained plentifully by beating hawthorn hedges; or we may find it at rest on palings with its head downwards, and standing on its two first pairs of legs, the hind pair being stowed away by the side of the body.

FAMILY X. GRACILARIIDÆ.

GRACILARIA STIGMATELLA.

This species is also tolerably common and pretty generally distributed throughout the country; it is not recorded however as occurring in Scotland or Ireland.

The expansion of the wings is rather more than ½ inch. The fore-wings are reddish-brown, with a conspicuous whitish-yellow triangular spot on the middle of the costa; this reaches to the fold, and its apex is there a little produced posteriorly.

The larva is greenish-white, with the head yellowish-brown; it feeds in August and September on leaves of willow, sallow, and poplar, rolling them up into the form of a sugar-loaf.

The perfect insect appears in September and October, and may sometimes be met with at ivy-blossoms; it lives through the winter, and reappears in the spring in rather wasted condition; it is then frequently found on the blossoms of sallows by those searching for the *Tæniocampæ;* it may occasionally be found at rest on palings, with its head much elevated and the middle pair of legs stuck out to give it a firmer position.

Closely allied to this is that pest of our gardens *Gracilaria syringella,* which often discolours all the leaves of our lilac bushes in the middle of summer.

FAMILY XI. COLEOPHORIDÆ.

COLEOPHORA OCHREA.

(Plate XVI., Fig. 2.)

This species seems almost confined to chalky localities in the south of England, but has been noticed in Cheshire on the limestone.

The expansion of the wings is about ¾ inch. The fore-wings are ochreous, with two silvery streaks, one along the fold and the other, which is narrower, along the inner margin; the antennæ have a long ochreous tuft at the basal joint, and are much thickened with ochreous hairs nearly to the middle.

The larva feeds in May on the leaves of the common Sun Cistus (*Helianthemum vulgare*), mining large blotches; out of a piece of mined leaf it constructs a large, unwieldy, portable case, out of all proportion to its own size.

The perfect insect appears in July and August, but is rather a difficult species to meet with; it may be occasionally started as we walk amongst its food plant, or we may obtain it by using the sweeping-net.

FAMILY XII. ELACHISTIDÆ.

CHRYSOCLISTA LINNEELLA.

(Plate XVI., Fig. 3.)

This very handsome species is extremely abundant in the immediate neighbourhood of London, and has occurred at Bristol, and other parts in the south of England; in Ireland it has occurred at Holywood.

The expansion of the wings is very nearly ½ inch.

The fore-wings are deep orange, with all the margins black, and with three rounded tufts of silvery black scales, two of which are near the inner margin, and the third is intermediate between them near the costa.

The larva is yellowish-white, with the head pale brown. It feeds under the bark of the lime-tree in winter and early spring.

The perfect insect appears in July and August, and sits on the trunks of lime-trees; in St. James's Park it may be collected in any quantity, and it is very pretty to see these brilliant little insects walking leisurely about, their white-tipped black antennæ in constant motion.

FAMILY XIII. LITHOCOLLETIDÆ.

LITHOCOLLETIS ROBORIS.

(Plate XVI., Fig. 4.)

This delicately-pretty insect seems widely distributed; it occurs near London and in various parts of the south of England, but seems commoner in the north at Scarborough, Darlington, and Newcastle-on-Tyne; it does not appear to have been noticed in Scotland nor in Ireland.

The expansion of the wings is about ⅓ inch. The fore-wings are white, with an oblique golden-brown band from the base of the costa reaching to the inner margin a little before the middle; beyond the middle are four short black lines from the costa and one from the inner margin.

The larva, like many others of this genus, mines blotches in the underside of oak leaves; the mined part curves downwards from the contraction of the loosened lower skin; the larva occurs in July and September.

The perfect insect appears in May and August, and may be either beaten from the branches of oak-trees, or in moderately windy weather it may be found sitting on the trunks of oak-trees.

FAMILY XV. NEPTICULIDÆ.

NEPTICULA AURELLA.

This brilliant little insect is generally distributed throughout the country and very common.

The expansion of the wings is about ¼ inch. The fore-wings are of a rich golden-brown, tinged with purple beyond the middle, and with the tip of the wing deep violet; beyond the middle is a nearly straight pale golden fascia; the head is reddish (in the closely allied *N. splendidissima* the head is black).

The yellow larva makes long tortuous galleries in the leaves of bramble; it may be found throughout the year. I have often collected it between Christmas and New Year's Day.

The perfect insect appears from March to August; it may be found at rest on palings and trunks of trees, or may be met with on the wing soon after sunrise.

The small *Nepticula microtheriella,* of which sometimes between thirty and forty larvæ may be found in a single nut-leaf, each in its slender little gallery, is much smaller than *N. aurella,* little more than half the size.

PTEROPHORINA.

PTEROPHORUS ACANTHODACTYLUS.

(Plate XVI., Fig. 5.)

This prettily marked Plume has occurred in various parts of the south of England, though nowhere very abundantly; northwards it occurs at York and Scarborough; it does not appear to have been noticed in Scotland or Ireland.

The expansion of the wings is about ¾ inch. The fore-wings are reddish-brown, with a dark brown costal triangle before the fissure, followed by a slender yellowish transverse streak; a slender yellowish band towards the hind margin is preceded by a dark brown blotch on each lobe.

The larva feeds on rest-harrow, geranium, and various other plants in June and July.

The perfect insect appears in July and August; it may sometimes be started as we walk amongst rest-harrow.

PTEROPHORINA.

PTEROPHORUS PTERODACTYLUS. THE COMMON PLUME.

(Plate XVI., Fig. 6.)

This species is generally distributed, and common throughout the country.

The expansion of the wings is very nearly an inch. The fore-wings are rather variable in colour, pale brown or pale grey, with a small dark blotch before the fissure and sometimes a smaller, less distinct dark spot a little beyond on the costa; sometimes there are some blackish dots along the hind margin, especially of the lower lobe.

The greenish larva feeds on convolvulus, eating either the leaves or seeds in August and September.

The perfect insect appears in September and October, when we may often find it at ivy-blossoms or see it at rest on palings; it lives through the winter, and is again met with in early spring; its resemblance when at rest on a paling to the letter T has been already noticed (p. 41).

ALUCITINA.

ALUCITA POLYDACTYLA. THE TWENTY-PLUME MOTH.

(Plate XVI., Fig. 7.)

This curious little insect is generally distributed and common throughout the country.

The expansion of the wings is rather more than ½ inch. The forewings are yellowish-grey, with two dark grey bands obscurely edged with whitish, and the outer fascia terminates on the costal feather in a single spot; the costal feather has besides three other dark spots, two before the first band and one between the two bands.

The larva feeds in the unexpanded buds of the honeysuckle in June and July.

The perfect insect appears in August and September, and hybernating is again met with in spring; it is often found in houses and outhouses, and may be seen flying of its own accord towards dusk.

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THE END.

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PLATE I.

1. Colias Edusa, ♂.
2. Anthocharis cardamines, ♂, underside.
3. Arge Galathea.
4. Hipparchia Tithonus, ♂.

PLATE II.

1. Vanessa Atalanta.
2. Thecla betulæ, underside.
3. Chrysophanus Phlœas.
4. Polyommatus Adonis, ♂.
5. Thymele alveolus.

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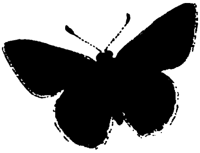

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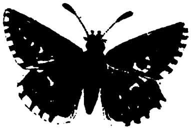

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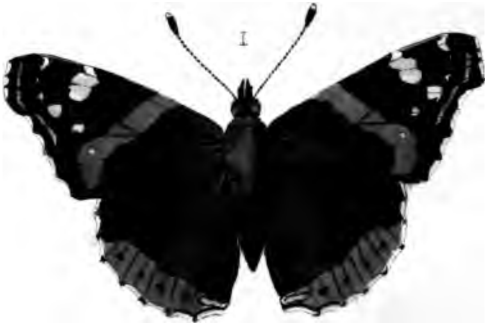

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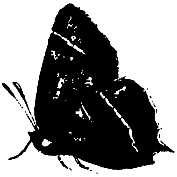

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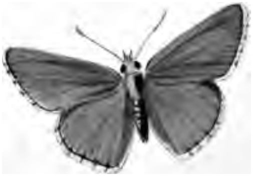

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PLATE III.

1. **Procris globulariæ, ♂.**
2. **Anthrocera filipendulæ.**
3. **Smerinthus tiliæ.**
4. Macroglossa stellatarum.
5. Sesia bombyliformis.
6. Trochilium formicæforme.

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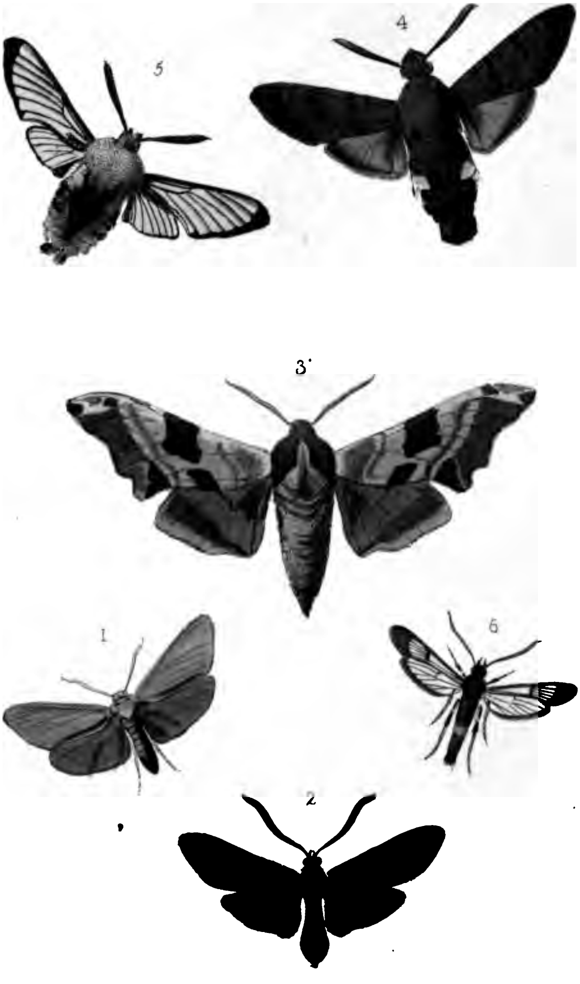

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PLATE IV.

1. **Hepialus velleda.**
2. **Notodonta ziczac.**
3. **Diloba cæruleocephala.**
4. **Clostera anachoreta.**
5. **Pygæra bucephala.**

4

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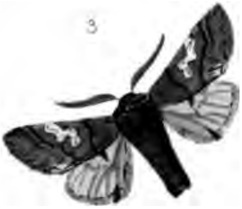

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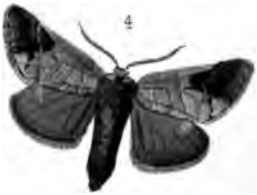

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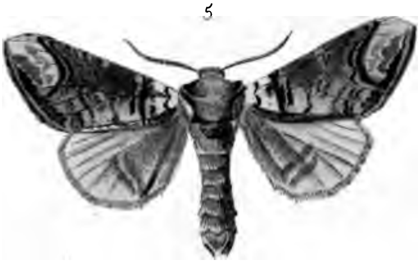

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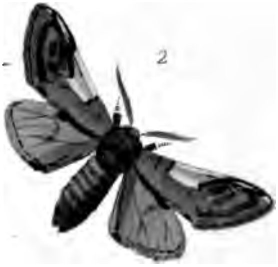

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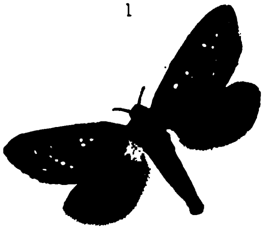

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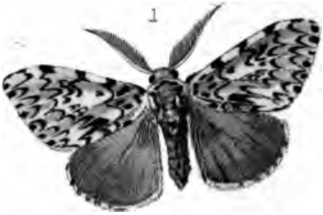
PLATE V.

1. Psilura monacha.
2. Orgyia gonostigma, ♂.
3. Hypercompa dominula.
4. Lithosia complanula.
5. Arctia villica.

1



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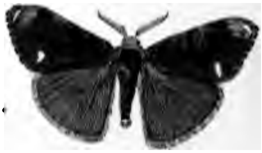

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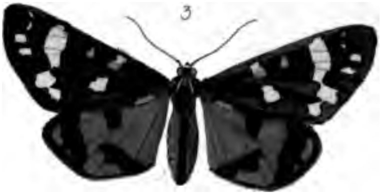

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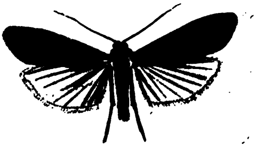

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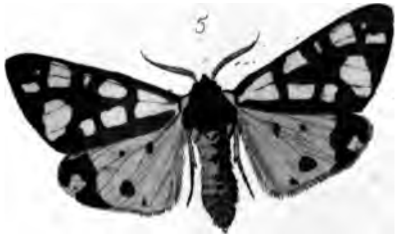

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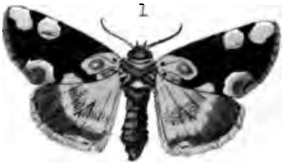
PLATE VI.

1. **Thyatira batis.**
2. **Cymatophora flavicornis.**
3. **Bryophila perla.**
4. Leucania conigera.
5. Hydræcia nictitans.
6. Heliophobus popularis.

1



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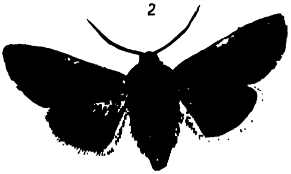

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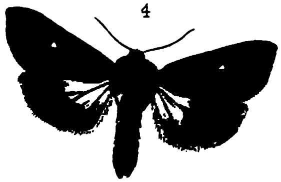

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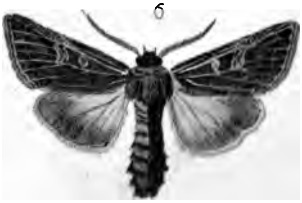

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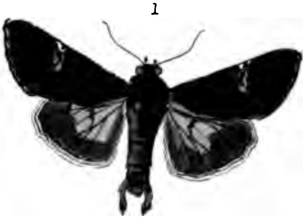
PLATE VII.

1. **Mamestra persicariæ.**
2. **Miana literosa.**
3. **Agrotis agathina.**
4. Triphæna ianthina.
5. Noctua plecta.
6. Tæniocampa gothica.

1



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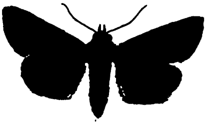

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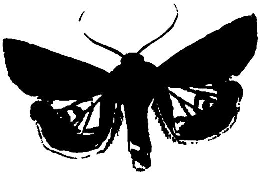

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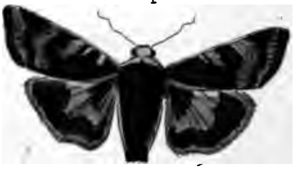

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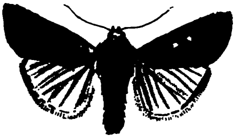

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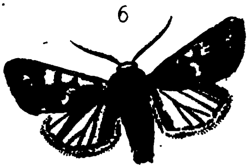

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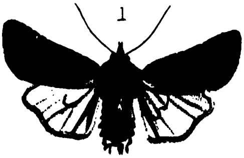
PLATE VIII.

1. Hoporina croceago.
2. Dicycla Oo.
3. Hecatera serena.
4. Phlogophora empyrea.
5. Hadena rectilinea.
6. Heliothis marginata.

1



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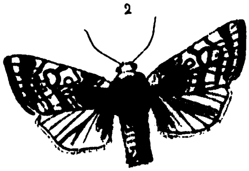

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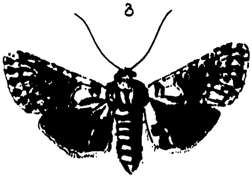

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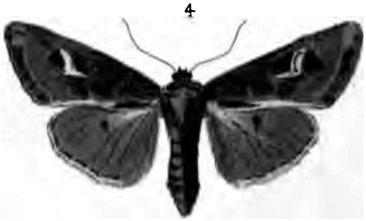

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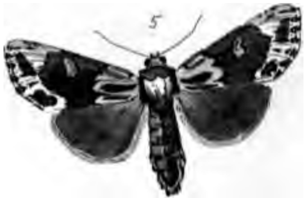

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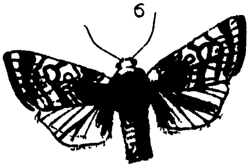

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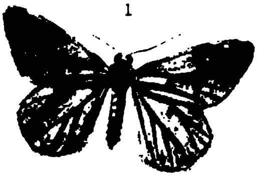
PLATE IX.

1. **Rumia cratægata.**
2. **Selenia illustraria.**
3. **Ennomos tiliaria.**
4. Nyssia zonaria, ♀ and ♂.
5. Hemerophila abruptaria.

1



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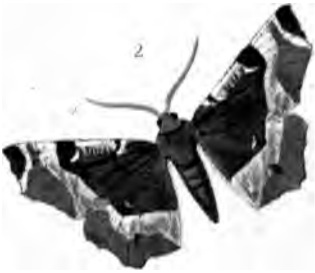

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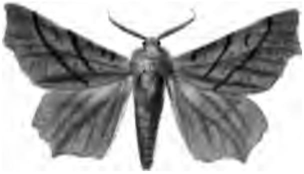

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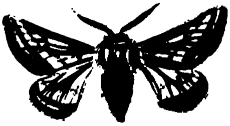

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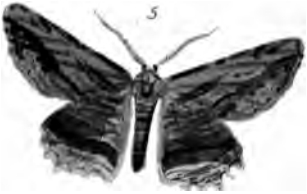

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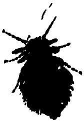

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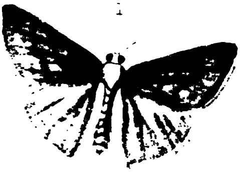
PLATE X.

1. Pseudoterpna cytisaria.
2. Ephyra omicronaria.
3. Asthena luteata.
4. Acidalia ornata.
5. Bradyepetes amataria.
6. Macaria liturata.
7. Lozogramma petraria.

1



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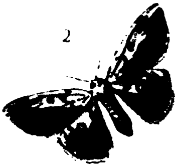

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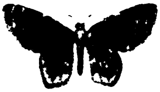

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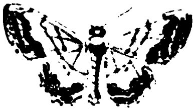

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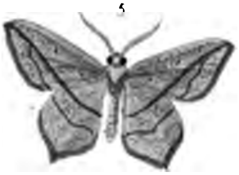

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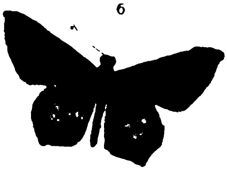

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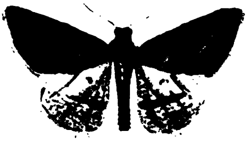

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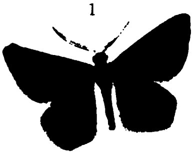
PLATE XI.

1. Fidonia limbaria.
2. Sterrha sacraria.
3. Ligdia adustata.
4. Hybernia leucophearia, ♂.
5. Eupithecia venosata.
6. Melanippe procellata.

11

1



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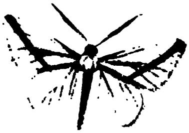

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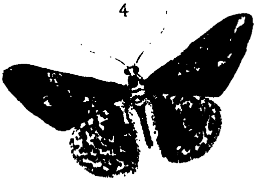

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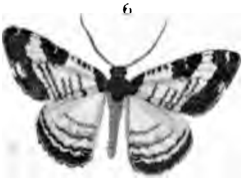

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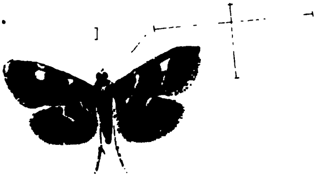
PLATE XII.

1. **Pyralis costalis.**
2. **Pyrausta purpuralis.**
3. **Diasemia literalis.**
4. Cataclysta lemnata, ♂.
5. Cataclysta lemnata, ♀.
6. Botys urticata.
7. Spilodes cinctalis.

1



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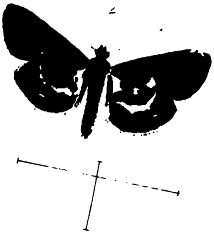

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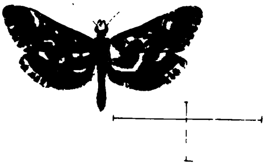

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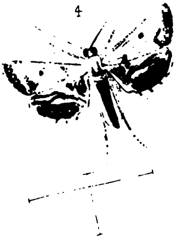

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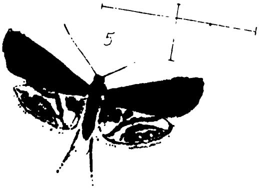

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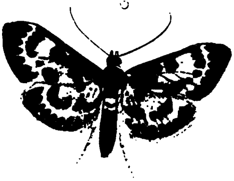

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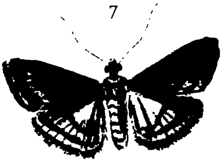

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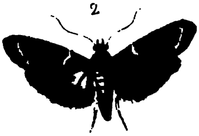
PLATE XIII.

1. Acrobasis consociella.
2. Cryptoblabes bistriga.
3. Pempelia carnella.
4. Pempelia formosa.
5. Crambus cerussellus, ♂ and ♀.
6. Crambus hamellus.
7. Crambus pinetellus.

2



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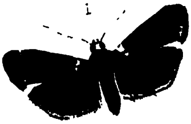

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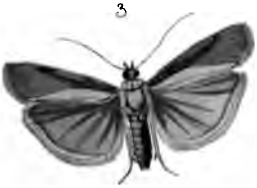

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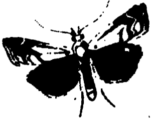
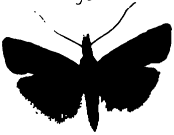


5♂



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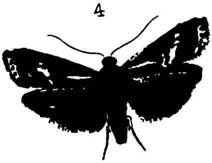

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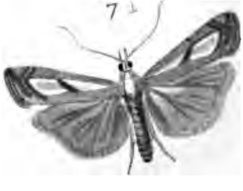

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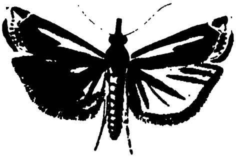

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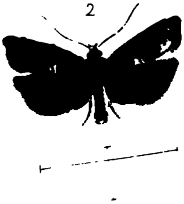
PLATE XIV.

1. Antithesia corticana.
2. Siderea achatana.
3. Notocelia Udmanniana.
4. Dicrorampha Sequana.
5. Anchylopera Lundana.
6. Crœsia Forskaleana.
7. Sericoris littoralis.
8. Calosetia nigromaculana.

2



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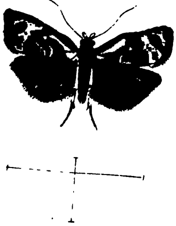

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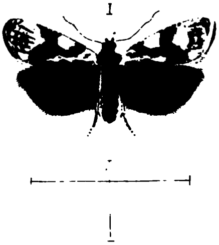

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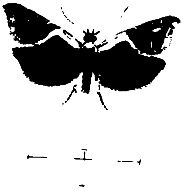

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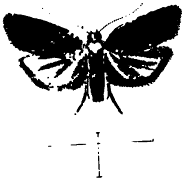

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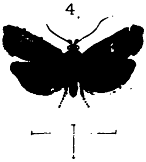

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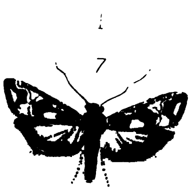

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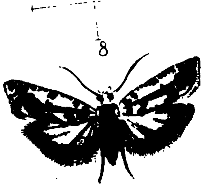

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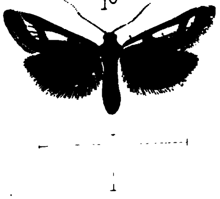
PLATE XV.

1. **Exapate gelatella, ♂ and ♀.**
2. **Chimabacche fagella, ♂.**
3. **Tinea ochraceella.**
4. Adela De Geerella, ♂.
5. Prays Curtisellus.
6. Phibalocera quercana.
7. Ypsolophus marginellus.

1♂



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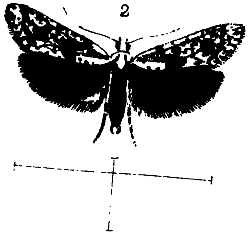
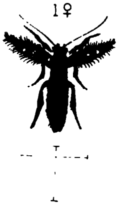


1♀



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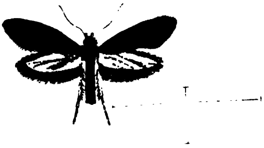

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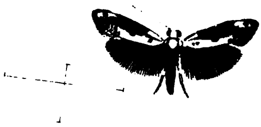

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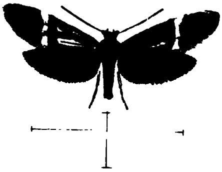

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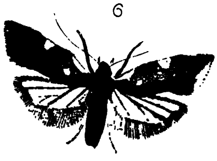

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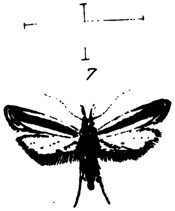

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PLATE XVI.

1. Antispila Pfeifferella.
2. Coleophora ochrea.
3. Chrysoclista Linneella.
4. Lithocolletis roboris.
5. Pterophorus acanthodactylus.
6. Pterophorus pterodactylus.
7. Alucita polydactyla.

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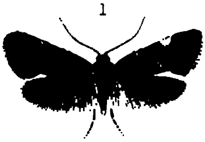

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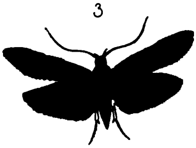

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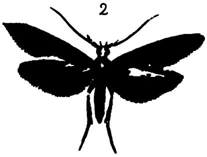

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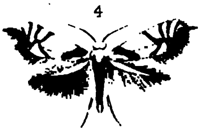

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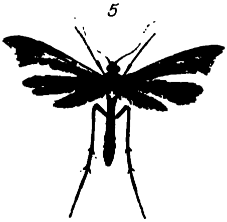

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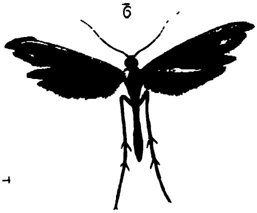

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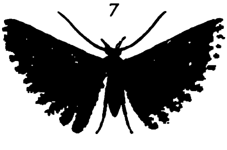

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> And so complete, but only he that owes them."
>
> *George Herbert.*

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